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COMMUNICATIONS

A STUDY OF THE CENTRAL AND PERIPHERAL LIGHT AND DARK ADAPTATIONS WITH VARYING BACKGROUNDS

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EXETER

IF the light threshold be defined as the least amount of light seen on a black background, and the light difference as the least amount of black seen on a white background, it is obvious that these extremes are joined together by an infinite number of intermediate positions from each of which a departure may be made in either direction of sensations lighter or darker than the background. In the present paper it is proposed to investigate the least differences in either direction at intermediate points, as well as in the one possible direction at the two extreme positions. The enquiry is directed to the peripheral as well as to the central capacity for discrimination, and the time required for adaptation.

The backgrounds used for the fields were:—

(1) Black velvet;

(2) 15 per cent. white;

(3) 76 per cent. white;

on a screen two metres square at a distance of one metre from the observer. The velvet gives the blackest background obtainable. The intensity of the white screen is governed by the phenomena of dazzle, so that a white value of 240 foot candles (daylight) is the highest that can be usefully employed. The right eye of the

writer of this paper was used, having a corrected vision 6/5, a full field, a dark adaptation a little above normal, and a slight over-sensitivity to bright lights.

Peripheral Field.—As the field for 3/1000 is the widest that can be measured on a screen two metres square, 3 mm. discs were used as test objects, varying from black velvet through a series of greys to white, mounted on Traquair's rod for the velvet screen, on brake wire painted with colour similar to the screen for the other backgrounds. Light reflected from the screens and discs was measured by the Holophane Lumeter, which measures from 0·0025 to 20000 ft. candles. In the experiments a daylight illumination of 240 ft. candles was the highest used, as reflected from a white screen. Variations from full daylight were obtained by dark blinds.

According to definition the outline of the field of vision (isopter) for any particular object and illumination is also a threshold, for anything less than that is not perceived at that line. This must be qualified for the absolute limit of the field of vision, where the smallest or least illuminated object perceived must be taken as the threshold.

The average of the eight principal meridians was ascertained, neglecting the blind spot; each point on the field charts represents such an average meridian, these being the co-ordinates, the abscissae being the light values of the discs.

A preliminary investigation was made upon the field of vision in the fully adapted eye under various illuminations with the backgrounds already given.

ADAPTED EYE

TABLE I.—VELVET SCREEN

	GRAPH A		GRAPH B		GRAPH C		GRAPH D	
	Disc values — Foot candles	Average meridia.	Disc values — f.cs.	Average meridia.	Disc values — f.cs.	Average meridia.	Disc values — f.cs.	Average meridia.
White	·0525	33	4·0	41·5	45·0	46	95	46
	·025	26	1·9	40·0	21·5	44	45	43
	·0079	20	0·6	36·0	6·7	41·5	14·2	40·5
	·0044	12	0·34	26·0	3·82	36	8·05	37
Black		—	0·0	8·25	0·53	18	1·25	23

TABLE II.—15 PER CENT. WHITE SCREEN

	GRAPH E		GRAPH F		GRAPH G	
	D.V.	A.M.	D.V.	A.M.	D.V.	A.M.
White	4·5	38·5	35·0	38·5	90·0	38
	2·16	27	16·6	32·5	43	35
Screen	0·7	0	5·35	0	13·8	0
	0·675	3·0	4·55	16·5	13.5	8
	0·383	13·5	2·9	22	7.65	24
Velvet	0·0	36	0	35	0	37

TABLE III.—76 PER CENT. WHITE SCREEN

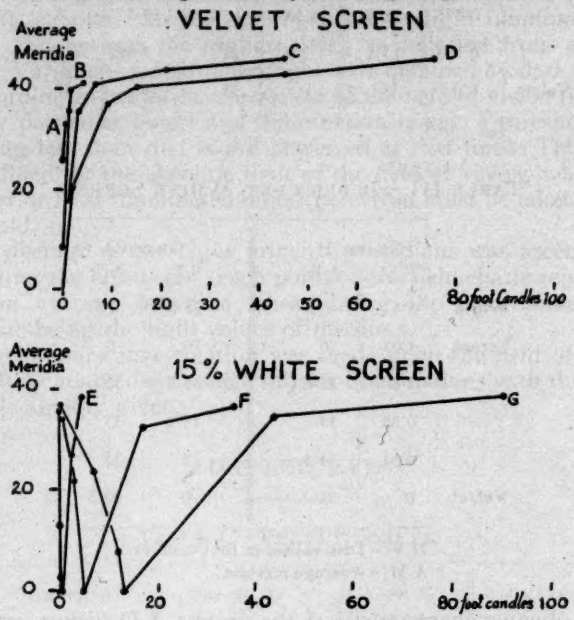
	GRAPH H		GRAPH I	
	D.V.	A.M.	D.V.	A.M.
White	5·5	6·5	95·0	7
Screen	4·05	0	70	0
	2·6	31·0	45·5	30
	0·85	33	14·2	33
	0·51	34·5	8	35
Velvet	0	35	0	38·5

D.V. = Disc values in foot candles.
A.M. = Average meridia.

The obvious characteristic of the graphs A-D (velvet screen) is the steep rise to the 35°-40° meridians in the four graphs and the slow rise thence to the highest point reached in B, C, and D graphs. It means a great discrimination of differences of illumination up to the 35° meridian, a slighter discrimination beyond this to the edge of the field. The result of this is a very marked angle, above and below which the graph is nearly straight. The angle corresponds fairly well with the same grey disc in each graph; the 8·35 per cent. marking the beginning and the 15 per cent. disc the finish of the bend. If the light values be reduced to percentages and charted (see Chart IV), this correspondence will be seen more clearly, but the angles are less marked as the illumination gets further below 45 ft. candles white value.

Some practical points arise. A considerable difference in illumination, from 4 to 95 ft. candles make a difference in size of the field of only 5·5°. The former would mean a dull winter day about 3 p.m., the latter a bright day without direct sunlight; so that the size of the field is fairly constant within wide limits of lighting. Grey is occasionally useful in testing fields for lowered light threshold, the importance of using a tint near the angle of

[NOTE.—In some Graphs the base lines for the abscissae and co-ordinates are omitted, being indicated by dashes adjoining the scales.]

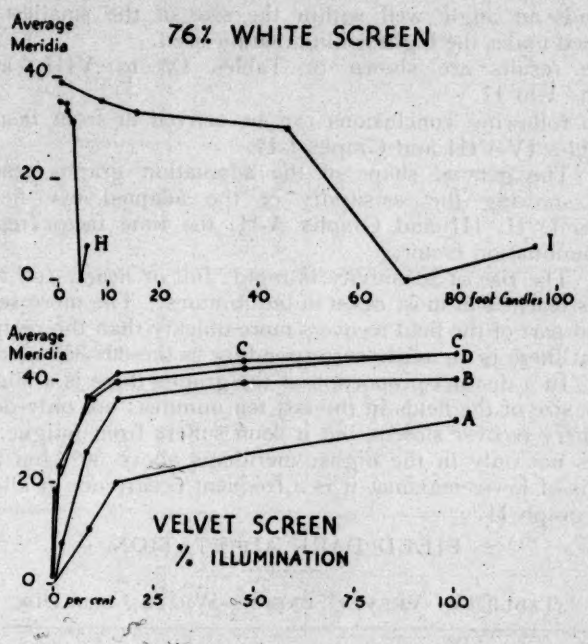


the graph is obvious, a reflecting value of 12 per cent. would be a good average to employ. For it is at the bend that a loss of sensitivity will make the greatest difference to the field and graph.

The fields on the 76 per cent. white screen will now be considered. Although the graph for a 5·5 foot candles white value is much steeper than that for 95 foot candles, when it was drawn on a percentage light value it was found nearly to agree in shape with the latter. Working from the screen value as zero, it will be seen that the rise on either side is decidedly less steep than with the velvet screen graphs, although an angle is shown at meridian 30°. The highest meridians for black on this screen are less than for white in the velvet screen group, although there

is as much alteration in light values as in C. and B. velvet screen graphs and the size of the discs is the same.

A special series of finely graduated grey discs was used to investigate the slope from zero in I. to the angle corresponding to the 45·5° f.c. value, to ascertain if it were as shown. Allowing for small margins of error it was correct.



Thus it will be seen that the field up to 35° on a white background is less susceptible to slight differences from white than it is to equal white differences from a black background.

The fields on the 15 per cent. white background show an intermediate position between the velvet and 74 per cent. white screens. The highest point is less than with the velvet screen while the ascent from zero with discs blacker than the screen is decidedly steeper than with discs whiter than the screen. To put this another way, the black-light differences are more readily appreciated than the white-light differences.

Fields under dark adaptation.—In some cases a preliminary field was taken with the eye fully adapted to the room illumination. This is shown in the graphs by a horizontal black line, from which a vertical line descends to the zero meridian. The

room was then darkened, the fields being taken at 0, 3, 10, 20, and 30 minutes, or at 0, 5, 15, 25, and 30 minutes. Only velvet and white discs were used. For the intermediate screens between black and white both discs were employed. The backgrounds used were:—Velvet; 31 per cent. white; 50 per cent. white; 69 per cent. white; white. No precautions as to the size of the pupil were taken. It is obvious that a 3 mm. disc at 1 metre subtends an angle well within the size of the smallest pupil obtained under the highest illumination used.

The results are shown in Tables IV to VIII, and in Graphs 1 to 17.

The following conclusions can be arrived at from inspection of Tables IV-VIII and Graphs 1-17.

(1) The general shape of the adaptation graphs resembles those showing the sensitivity of the adapted eye fields in Tables I, II, III and Graphs A-H, the time factor replacing the illumination factor.

(2) The rise of sensitivity is rapid; full or nearly full adaptation is reached in most cases in ten minutes. The more sensitive central part of the field recovers more quickly than the peripheral, so that there is an angle corresponding to the 30°-35° meridia.

(3) In a distinct proportion of the graphs there is a slight fall in the size of the fields in the last ten minutes; not only does the periphery recover slowly, but it soon suffers from fatigue. This occurs not only in the higher meridians above 30°, but also in graphs of lower maxima, it is a frequent occurrence at all levels, *e.g.*, graph 11.

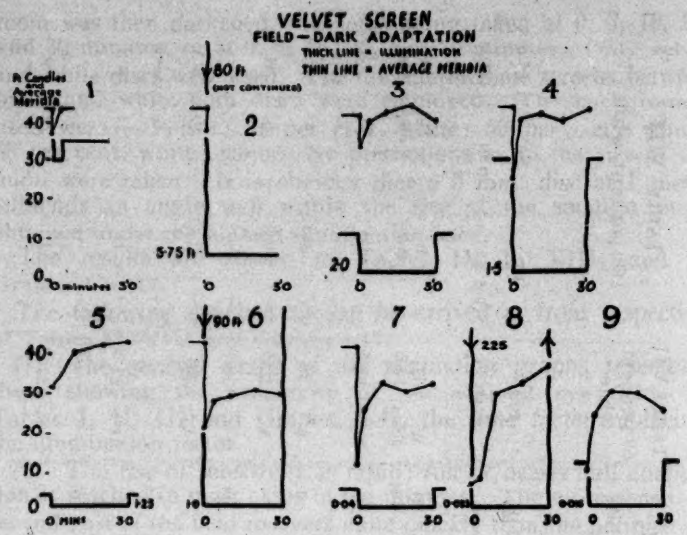
FIELD DARK ADAPTATION

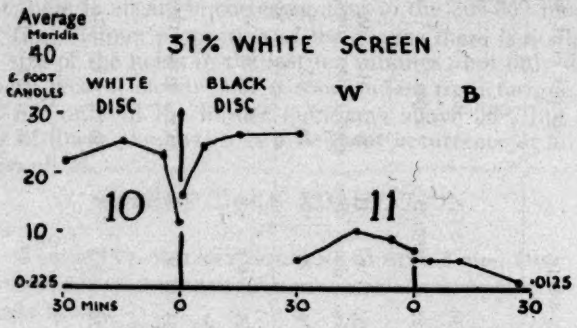
TABLE IV—VELVET SCREEN—WHITE 3 mm. DISC

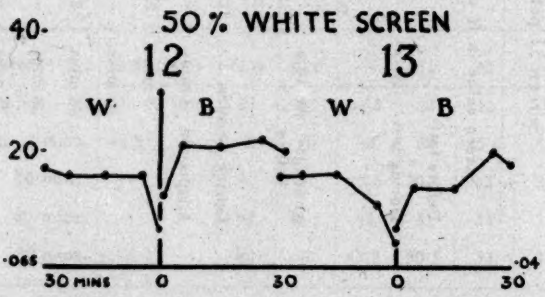
White light in foot candles before test	35·0	90·0	12·0	30·0	4·0	90·0	6·0	225·0	12·0
During test	30·0	5·76	3·0	1·5	1·25	1·25	0·04	0·035	0·015
Average meridia. before ...	42·5	43·5	41·0	42·5	—	43·5	42	—	—
During 0 mins. ...	37	38·5	33	30	32·5	22	12	7	12
Adaptation 3 mins.	42·5	—	40	40	33	28	25·5	8·5	22
10 mins.	—	—	42	41	40·5	29·5	33	30	30·5
20 mins.	—	—	43	38·5	42	31	31	33	30
30 mins.	—	—	40	40	43·5	30·5	33	37	25

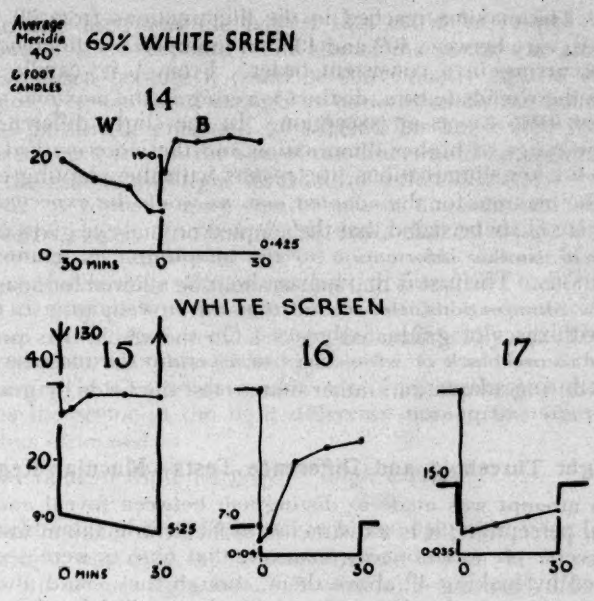
	TABLE V Screen 31 per cent. white				TABLE VI 50 per cent. white				TABLE VII 69 per cent. white		TABLE VIII 100 per cent. white				
Screen value in ft. candle															
Before test	30		5·5		30		7·0		19·2		130		7·0		15·0
During test	0·225		0·0125		0·065		0·04		0·425		9–5·25		0·04		0·035
	W. disc	B. disc	W. disc	B. disc	W. disc	B. disc	W. disc	B. disc	W. disc	B. disc		B. disc		B. disc	B. disc
Average meridia. before	33	26	29	29	26	25	5	—	24·5	36·5		35		34	33
During 0 mins. ...	11·5	16	6·5	5	7	12·5	—	9	8	16	—	29	—	4	5·5
Adaptation 3 mins.	—	—	—	—	—	—	—	—	8	22·5	—	30·5	—	6	6
5 mins.	23	24	9	5	15·5	21·5	11·5	14	—	—	—	—	—	—	—
10 mins.	—	—	—	—	—	—	—	—	13·5	22·	—	32·5	—	19	6·5
15 mins.	25	26	9·5	5	16·	21	16	14	—	—	—	—	—	—	—
20 mins.	—	—	—	—	—	—	—	—	14·5	22·5	—	33	—	23	8·5
25 mins.	—	—	—	—	16·	22	16·5	20	—	—	—	—	—	—	—
30 mins.	22	28	4·5	1·5	17·	20	16	19	18	22·0	—	32	—	24	9

W. disc = White disc. B. disc = Black disc.


VELVET SCREEN
FIELD — DARK ADAPTATION
THICK LINE = ILLUMINATION
THIN LINE = AVERAGE MERIDIA
1
2
3
4
5
6
7
8
9
80 ft
5·75 ft
20
15
90 ft
225
0·004
0·0125
minutes 30
0 MINS 30


Average
Meridia
31% WHITE SCREEN
WHITE
DISC
BLACK
DISC
W
B
10
11
0·225
·0125
30 MINS


50% WHITE SCREEN
12
13
W
B
W
B
·065
·04
30 MINS



(4) There is a rough correspondence between the maxima during adaptation and the maxima of sensitivity in the fully adapted eye.

(5) In the grey fields of 69 per cent. and 50 per cent. white there is a higher level for the black disc. In the 31 per cent. white there is little difference at the 0·225 ft. candle level, at 0·0125 f.c. the black meridians are decidedly lower than the white. It must be borne in mind that the illumination difference between the screen and the discs is greater for the black in the 61 per cent. screen, for the white in the 31 per cent. screen; it is only in the 50 per cent. screen that the difference is the same for the two discs. Yet in both graphs for the 50 per cent. screen the black disc has the higher meridian, *i.e.*, the adapting eye responds more to the black differences just as the adapted eye responds to finer differences in dark objects.

(6) The initial fall in the size of the field bears a general relation to the depth to which the light is lowered rather than to the height from which it falls. An exception is graph 8 (velvet screen), where the decrease was from 240 ft. candles to 0·035 f.c., a great difference. In this case the initial meridian was 6°, as compared with graph 9, where a fall from 12 f.c. to 0·015 f.c. was accompanied by a fall to meridian 10°.

(7) The maxima reached in the illuminations from 30 f.c. to 1·25 f.c. vary between 40° and 43°, an unimportant difference, and not occurring in a consistent order. From 1 ft. candle downwards there tends to be a distinct lowering in the maxima, though 37° for 0·035 f.c. is an exception. In the slight differences for a large range of higher illumination and the more marked differences for low illuminations, the results with the adapting eye are like the maxima for the adapted eye, as would be expected.

It may fairly be stated that the adapted normal eye gives information of similar information to the adapting eye, granted two conditions. The first is that half-an-hour be allowed for adaptation in low illuminations, the second that the investigation is carried out with discs of graduated greys. On the whole it is probably easier to use black or white discs to ascertain the increase in the fields during adaptation, rather than to test the fields by graduated greys after adaptation.

Light Threshold and Difference Tests—Macular Region

No attempt was made to distinguish between foveal and parafoveal perception; it is a distinction difficult to make in untrained observers. It was noticed, however, that objects were seen best defined by looking 4° above them, though they could always be seen in this case by direct vision, but less well defined.

The tests were made in five groups, the backgrounds being the screens used in the peripheral adaptation tests. In all but the velvet screen a circular disc 9 cm. in diameter, covered with paper like the screen, had mounted on its centre a segment of lighter or darker paper. The disc was rotated by a small dynamo, so that the segment then made a disc 14 mm. in diameter in the centre of the large disc, lighter or darker as the case might be. The smallest segment that could be distinguished during rotation was taken as the measure of the light difference, its value being calculated thus:—

Percentage light value of large disc less

Percentage light value of sector

= per cent. light difference.

$$\frac{\textit{Angle of sector}}{360^\circ} \times \textit{Light difference} \times \textit{Light value of screen}$$
$$100$$

= Actual light difference in foot candles. The reciprocal of this was taken as the sensitivity, and used in the graphs. The advantage of using the sensitivity is that the curve records the increased perception as a rise; if the actual difference perceived is recorded, the part of the curve showing the greater perception is practically flat, so that it fails to give the impression of increased sensitivity.

The disc used was the largest that could be rotated by the dynamo at one's disposal. The size of the sector was arbitrary, it was chosen because it could be conveniently seen at a metre distance, yet was small enough to be well within the boundaries of the parafoveal area and to subtend an angle less than the smallest pupil, so that the size of the latter could be neglected.

In the case of the light threshold a different method was employed. A white or grey disc 17 cm. in diameter had one half covered by velvet. In front of this was a disc covered with velvet from which an annulus of 180°, 1·0 cm. wide was cut out. By rotating the annulus disc any proportion from 180° to 2·5° of the white (or grey) half of the posterior disc could be exposed. When the two discs were rotated together sufficiently quickly, the exposed sector was thus diluted by black. It was viewed through an opening in a velvet-covered screen of approximately the same size as the sector in the light difference tests. The light value was thus estimated:—

$$\text{Light value of white (or grey)} \times \frac{\textit{angle exposed}}{360^\circ}$$

= light value of sector exposed in screen opening.

Daylight was used for illuminations as low as ·01 ft. candles. Below this electric light from a frosted bulb was used, this being reduced by diaphragms to the required illumination. If this were not sufficient, glasses of smoke tint were added.

With each of the five screens employed a number of observations were made with different illuminations, each observation lasting half-an-hour. As in the case of the field adaptation tests, a series of tests was made at intervals during the half hour, the final sector readings forming the basis for the estimation of the threshold and light differences respectively. Like the field tests, in the 31 per cent., 50 per cent., and 61 per cent. white screens the least differences were calculated in both directions.

Summary of Central Adaptation Test

A = White value of disc in ft. candles at 1 metre from disc.

W = Percentage of white difference of sector from screen $\div 100 \times$ angle of sector $\div 360^\circ$.

A W = Value of white difference in ft. candles.

$\frac{1}{\text{A W}}$ = Sensitivity to white difference.

B = Percentage of black difference of sector from screen $\div 100 \times$ angle of sector $\div 360^\circ$.

A B = Black difference in ft. candles.

$\frac{1}{\text{A B}}$ = Sensitivity to black difference.

TABLE IX—CENTRAL ADAPTATION

VELVET SCREEN (Annulus 31 per cent. White)

A	Angle exposed	W	A W	$\frac{1}{A W}$	Log A	Log $\frac{1}{A W}$	Graph reference
140	2·5°	0·00215	0·3	3·3	2·14	0·51	22
95	2·5	0·00215	0·204	4·9	1·98	0·69	
60	2·5	0·00215	0·127	7·5	1·77	0·87	
13	5	0·0043	0·056	18	1·11	1·25	
5	7·5	0·0065	0·032	32	0·7	1·5	21
1·4	20	0·0173	0·024	41·5	0·146	1·62	
1·0	12·5	0·0103	0·0107	92·5	0·0	1·96	20
0·5	15	0·0136	0·0072	156	$\bar{1}$·7	2·19	
0·05	30	0·026	0·00128	782	$\bar{2}$·7	2·89	
0·03	40°	0·0345	0·00102	980	$\bar{2}$·47	2·99	
0·015	40°	0·0345	0·00052	1923	$\bar{2}$·176	3·28	
0·01	40°	0·0345	0·00034	2925	$\bar{2}$·0	3·46	
0·0015	25°	0·0214	0·000032	31250	$\bar{3}$·176	4·49	19
0·000156	100°	0·0865	0·0000132	75000	$\bar{4}$·19	4·87	18
0·0000315	Nil	—	Nil	—	—	—	

TABLE X—CENTRAL ADAPTATION

TABLE X—CENTRAL ADAPTATION

WHITE SECTORS			31 per cent. White Screen			BLACK SECTORS				
A	W	A W	$\frac{1}{A W}$	Log A	Log $\frac{1}{A W}$	B	A B	$\frac{1}{A B}$	Log $\frac{1}{A B}$	Graph reference
35·0	0·0026	0·091	11	1·54	1·04	0·0021	0·0735	13	1·11	27
14·25	0·004	0.057	17·6	1·45	1·24	0·0021	0·0299	34	1·53	
8·0	0·004	0·032	31	0·9	1·49	0·0043	0·0344	29	1·46	
4·0	0·0039	0·0156	64	0·6	1·8	0·0043	0·0172	58	1·76	
1·5	0·0079	0·0118	84	0·176	1·92	0·0086	0·0129	77	1·88	
0·85	0·0079	0·0067	149	$\bar{1}$·92	2·17	0·0172	0·0146	68	1·83	
0·45	0·0079	0·00353	286	$\bar{1}$·65	2·45	0·0086	0·00085	260	2·41	
0·186	0·0079	0·00146	685	$\bar{1}$·27	2·84	0·0086	0·00158	633	2·8	26
0·055	0·0079	0·00043	2026	$\bar{2}$·74	3·31	0·0086	0·00047	2128	3·32	25
0·015	0·0236	0 000355	2800	$\bar{2}$·17	3·44	0·0172	0·000256	4000	3·6	
0·0134	0·0236	0·000332	3030	$\bar{2}$·12	3·48	0·0258	0·000345	2900	3·46	
0·0065	0·030	0·000195	5128	$\bar{3}$·81	3·7	0 039	0·000252	3948	3·6	
0·00174	0·045	0·000078	12771	$\bar{3}$·24	4·1	0·077	0·000134	7464	3·87	
0·0012	0·095	0·000114	8770	$\bar{3}$·08	3·94	0·073	0·000156	6410	3·8	
0·0008	0·095	0·000076	13160	$\bar{4}$·9	4·11	0·155	0·000124	8060	3·9	24
0·0002	0·156	0·0000312	32000	$\bar{4}$·3	4·5	0·26	0·000052	19200	4·28	23
0·000084	0·515	0·000043	23256	—	—	Nil	—	—	—	—

TABLE XI—CENTRAL ADAPTATION

WHITE SECTORS			50 per cent. White Screen			BLACK SECTORS				
A	W	A W	$\frac{1}{A W}$	Log A	Log $\frac{1}{A W}$	B	A B	$\frac{1}{A B}$	Log $\frac{1}{A B}$	Graph reference
87·0	0·004	0·35	2·85	1·94	0·45	0·0012	0·105	9·5	0·97	31
27	0·008	0·216	4·6	1·43	0·66	0·0025	0·068	15·	1·17	
13	0·008	0·104	9·6	1·11	0·98	0·0076	0·098	11·	1·04	
1·8	0·008	0·0144	69·4	0·25	1 84	0·0076	0·0137	73·5	1 86	30
0·19	0·016	0·00304	329	$\bar{1}$·27	2·51	0·011	0·00208	476	2·86	29
0·03	0·074	0·00222	708	$\bar{2}$·47	2·84	0·03	0·0009	1111	3·04	
0·01	0·074	0·00074	1351	$\bar{2}$·0	3·13	0·03	0·0003	3333	3·52	
0·000475	0·25	0·000086	11630	$\bar{4}$·67	4·06	0·187	0·0000895	11300	4·05	28
0·00023	0·25	0·000047	21000	$\bar{4}$·36	4·32	0·187	0·000043	23200	4·36	
0·00016	0·5	0.00008	12500	$\bar{4}$·2	4·09	0·5	0·00008	12500	4·09	
0·000032	Nil	—	—	$\bar{5}$·5	—	Nil	—	—	—	—

TABLE XII—CENTRAL ADAPTATION

WHITE SECTORS					69 per cent. White Screen	BLACK SECTORS				
A	W	A W	$\frac{1}{A W}$	Log A	Log $\frac{1}{A W}$	B	A B	$\frac{1}{A B}$	Log $\frac{1}{A B}$	Graph reference
160 0	0·0056	0·896	1·1	2·2	0·04	0·0053	0·848	1·2	0·07	35
19·0	0·0056	0·106	9·4	1·27	0·97	0·0053	0·1007	9·9	0·99	
8·75	0·004	0·035	29	0·93	1·46	0·0062	0·054	18·0	1·25	
2·75	0·008	0·022	46	0·43	1·66	0·0091	0·0243	40	1·6	
1·15	0·004	0·0046	217	0·06	2·33	0·0062	0·0072	139	2·14	
0·445	0·088	0·0039	253	$\bar{1}$·65	2·4	0·0062	0·0028	357	2·55	
0·188	0·0176	0·0033	300	$\bar{1}$·27	2·47	0·015	0·0028	357	2·55	34
0·125	0·0062	0·00077	1290	$\bar{1}$·09	3·11	0·0062	0·0028	1290	3·11	
0·055	0·0088	0·00044	2250	$\bar{2}$·74	3·35	0·0122	0·00067	1490	3·17	
0·052	0·0088	0·000457	2170	$\bar{2}$·71	3·33	0·0122	0·00063	1590	3·2	33
0·031	0·013	0·0004	2500	$\bar{2}$·49	3·39	0·0122	0·00035	2850	3·45	
0·026	0·027	0·0007	1430	$\bar{2}$·41	3·15	0·0275	0·00072	1400	3·14	
0·0032	0·15	0·00048	2060	$\bar{3}$·5	3·31	0·172	0·00054	1852	3·26	
0·00051	0·51	0·000108	9121	$\bar{4}$·7	3·96	0·51	0·00026	3840	3·58	32
0·00021	Nil	—	—	$\bar{4}$·32	—	0·69	0·000145	6900	3·83	

TABLE XIII—CENTRAL ADAPTATION

WHITE SCREEN

A	B	A B	$\frac{1}{A B}$	Log A	Log $\frac{1}{A B}$	Graph reference
200	0·007	1·4	0·7	2·3	$\bar{1}$·84	40
160	0·007	1·12	0·9	2·2	$\bar{1}$·95	
100	0·0065	0·65	1·5	2·0	0·176	
60	0·0065	0·384	2·6	1·77	0·41	
14	0·007	0·098	10·0	1·14	1·0	
3·5	0·007	0·0245	41·	0·54	1·61	39
1·4	0·007	0·0098	102	0·146	2·0	
0·65	0·007	0·00455	222	$\bar{1}$·81	2·34	
0·175	0·0069	0·0012	825	$\bar{1}$·24	2·91	38
0·1	0·0069	0·00069	1420	$\bar{1}$·0	3·152	
0·06	0·0069	0·000414	2417	$\bar{2}$·77	3·38	
0·04	0·02	0·0008	1250	$\bar{2}$·6	3·09	
0·0041	0·16	0·000656	1526	$\bar{3}$·61	3·18	
0·00065	0·25	0·000162	6150	$\bar{4}$·81	3·79	37
0·0004	0·5	0·0002	5000	$\bar{4}$·602	3·69	
0·000276	0·31	0·000085	11700	$\bar{4}$·44	4·06	36
0·00003	Nil	—	—	—	—	—

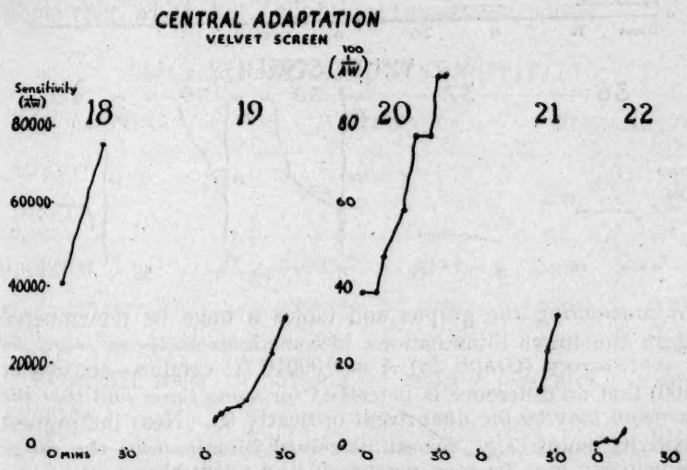
The central adaptation will be considered from three points of view. (1) The behaviour of the eye in the single experiments. (2) The curves showing the summation of the results of these under different illuminations. (3) Some mathematical considerations.

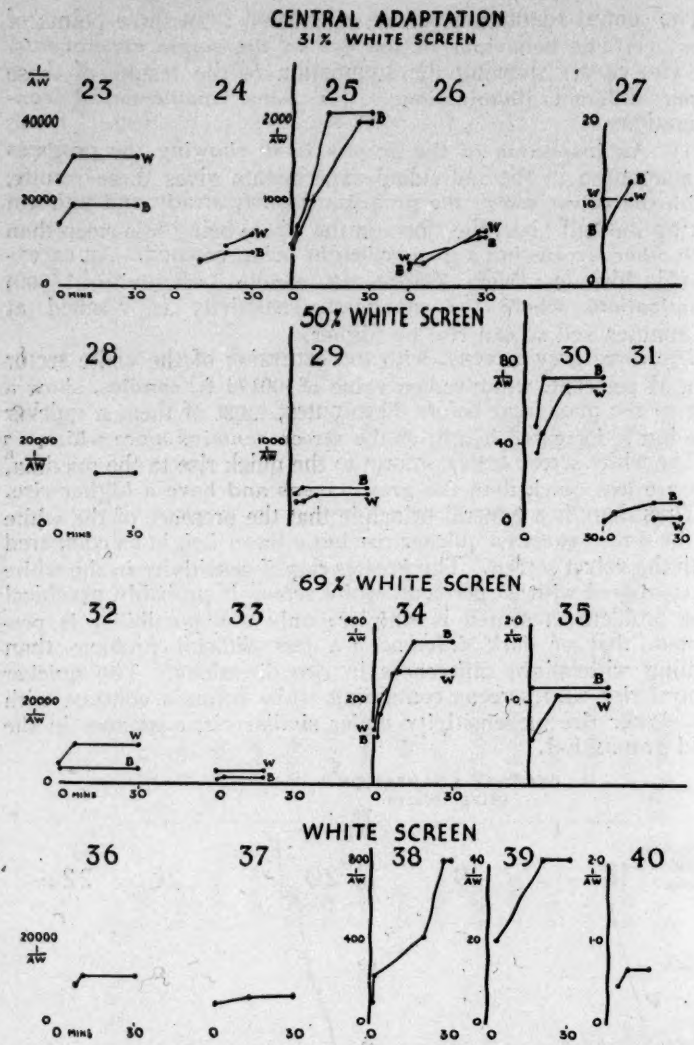
(1) An inspection of the graphs 18-40 showing the progress of adaptation in the individual experiments gives these results. With the velvet screen the progress is fairly steady and uniform during the half hour, the slope on the whole being less steep than with other screens but a greater height being reached. An exception is the test with ·000156 ft. candle (sensitivity = 75000) illumination, where the maximum sensitivity is reached at 20 minutes and so can rise no higher.

The three grey screens, with the exception of the white sector in a 31 per cent. white screen value of ·00174 ft. candles, show a rise to the maximum before 30 minutes, most of them a quicker rise but a decreased height as the screen contains more white.

The white screen tests conform to the quick rise to the maxima, but are less quick than the grey screens and have a higher rise.

Thus there is a general principle that the presence of the white in the screen causes a quicker rise but a lesser height as compared with the velvet screen. The greater rise of sensitivity in the white as compared with 69 per cent. white screen is probably psychical The problem presented is simpler; only one possibility is presented, that of dark difference; a less difficult problem than dealing with slight differences in two directions. The quicker central rise with screens containing white forms a contrast with the slower rise of sensitivity under similar circumstances in the field graphs E-I.





In considering the graphs and tables it must be remembered that in the lower illuminations it sometimes happens (*e.g.*, 50 per cent. screen (Graph 28) A = 0·00016 ft. candles—sensitivity 12500) that no difference is perceived for some time, and that the first result may be the final result or nearly so. Near the highest sensitivity point (*e.g.*, lowest perceived illumination) the range of sensitivity may be very narrow during adaptation.

(2) The summation curves J to N show the variations in light and dark differences at various illuminations for the five screens; each point on the curves is the maximum found for a particular experiment. As in the field experiments, with the grey screens there are two possibilities, a white and a black difference, each of which is separately plotted on the same graph; for the black and white screens only one graph is required.

In the adaptation summary and log graphs the graph for white difference is continuous, that for the black difference is interrupted.

One characteristic of all the summation graphs is the very steep rise of sensitivity as the illumination becomes lower. This continues through the whole series of points in any one graph. Although the part of the graphs corresponding with the higher illuminations appears flatter, this is only apparent, not real; as is shown by the special inset graph for the higher illuminations, which has the same shape as for the lower. The steep rise in the summation curves is a mathematical result of taking the reciprocal

$$\left(\frac{1}{A\,W} \text{ or } \frac{1}{A\,B}\right)$$ as the co-ordinates.

e.g., let A W = 1. $\frac{1}{A\,W} = 1$

let A W = ·01 $\frac{1}{A\,W} = 100$ and so on.

As will be shown later, if Weber's law holds, W. is constant, and the sensitivity will vary inversely as A, the light value of the screen.

There is a progressive fall in the maxima for different backgrounds, passing from velvet, as they contain more white, up to 69 per cent. white; but a slight rise from this to white.

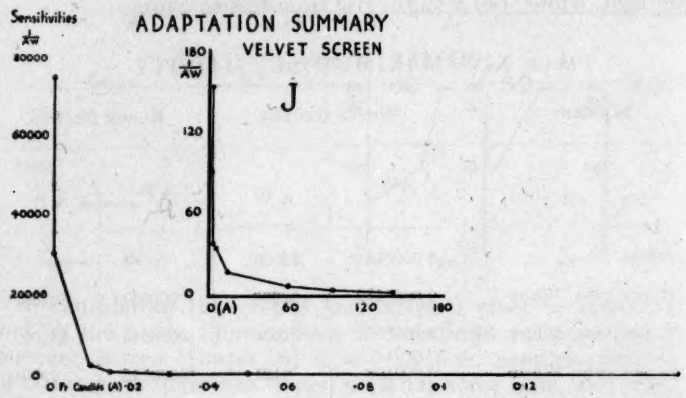
TABLE XIV—MAXIMUM SENSITIVITY

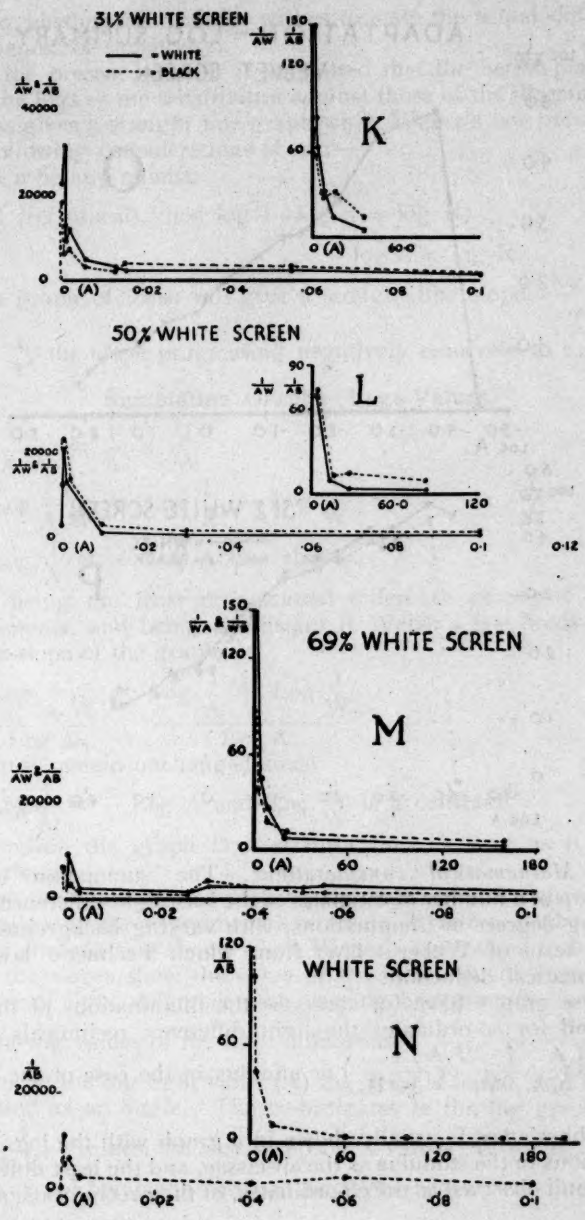
SCREEN	WHITE SECTOR		BLACK SECTOR	
	AW	$\frac{1}{A\,W}$	A B	$\frac{1}{A\,B}$
Velvet	0·0000132	75000	—	—
31 per cent. White	0·0000312	32000	0·000052	19200
50 per cent. White	0·000047	21000	0·000043	23200
69 per cent. White	0·000108	9121	0·000145	6900
White	—	—	0·000085	11700

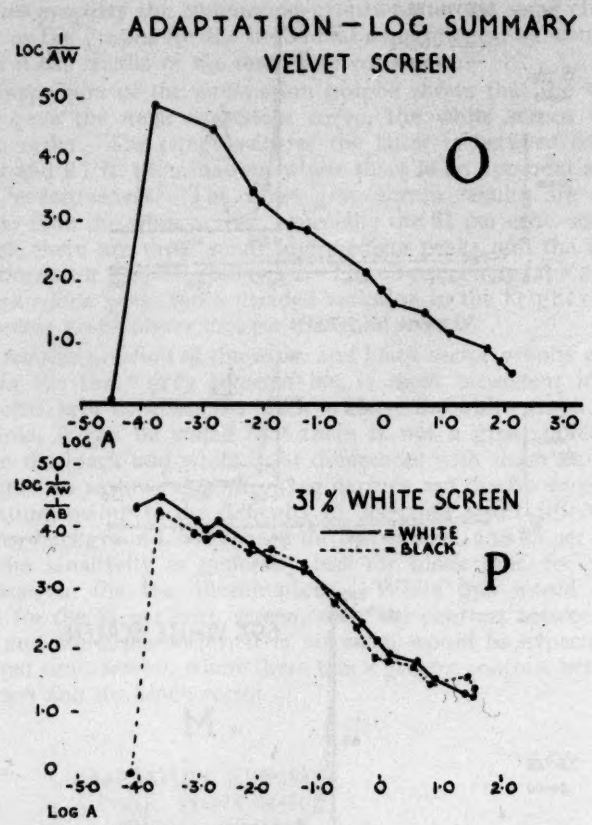
In this property the summation graphs show the same characteristic as the graphs for the individual experiments; as would be natural if the results of the tests were consistent.

An inspection of the summation graphs shows that the velvet screen gave the most consistent curve, the white screen being next in order. The irregularity of the latter is between 0·04 ft. candles and 0·1 ft. illumination, where there is an apparent slight rise in sensitiveness. The three grey screen results are more irregular than the white screen, especially the 31 per cent. screen; in which there are three small intermediate peaks and the black and white sector graphs cross twice. The 50 per cent. graph shows no intermediate peak, but a decided variation in the height of the black sector graph above that for the white sector.

The relative position of the white and black sector graphs varies much in the three grey screens, but is most consistent in the 50 per cent. screen, where the black is above the white graph. On the whole, it can be stated that there is not a great difference between the black and white light differences with these screens; it is better to assume that the irregularities are due to errors of observation, owing to the difficulty in detecting small differences on a grey background, but that in the 31 per cent. and 69 per cent. white the sensitivity is generally less for black than for white differences in the low illuminations. While this would seem natural for the 31 per cent. screen, with less contrast between the screen and the black sector, it is not what would be expected in the 69 per cent. screen, where there was a greater contrast between the screen and the black sector.




31% WHITE SCREEN
= WHITE
= BLACK
K
50% WHITE SCREEN
L
69% WHITE SCREEN
M
WHITE SCREEN
N



(3) *Mathematical considerations.*—The summation curves, made up of a number of estimates of the least light difference under varying degrees of illuminations, with varying backgrounds, are really tests of Weber's law, from which Fechner's law is a mathematical deduction.

These graphs have for abscissae the illuminations of the disc (A) and for co-ordinates the light difference reciprocals of the sectors $\left(\frac{1}{\text{A. W.}} \text{ or } \frac{1}{\text{A. B.}}\right)$ or annulus in the case of the velvet screen.

Fechner's law is usually shown in a graph with the logs of the variations in the stimulus as the abscissae, and the least differences of stimuli observed as the co-ordinates, or their reciprocals, accord-

ing to whether the recorder wishes to state the actual differences or fineness of sensitivity.

In the present series it is submitted that the better plan is to plot the logs of the sensitivities against those of the illuminations, as this gives a straight line graph while Weber's law prevails, as the following considerations show:—

Let n be any number.

$\frac{1}{n} = R$ (reciprocal), then $\log 1 - \log n = \log R.$

$$- \log n = \log R.$$

and a graph of these will give a straight line slope. $\frac{\log R,}{- \log n}$ of value $\frac{1}{1}$, the slope progressing negatively relatively to n.

Summation Graphs (Logs Values)

$$\frac{1}{A\,W} = \frac{1}{A} \times \frac{1}{W}$$

$$\text{Log } \frac{1}{A\,W} = \text{Log } \frac{1}{A} + \text{Log } \frac{1}{W}$$

$$\text{Log } \frac{1}{A} = - \text{Log A (see above).}$$

W being the least proportional difference perceived in the experiments, and being a constant if Weber's law holds.

The slope of the graph is

$$\frac{\text{Log } \frac{1}{A\,W}}{\text{Log A}} = \frac{\text{Log } \frac{1}{A} + \text{Log } \frac{1}{W}}{\text{Log A}}$$

and must remain unchanged since

$\text{Log } \frac{1}{A} = - \text{Log A}$ and $\text{Log } \frac{1}{W}$ is a constant.

Therefore the graph is a straight line as long as it obeys Weber's law.

Thus the advantage of plotting the logs against each other is that, allowing for experimental errors, a deviation in the graph from a straight line shows when Weber's law ceases to be true, while the slopes show the value of the increment of decrease or increase of light difference with varying backgrounds.

If the log values of the light differences $\left(\frac{1}{\text{A.W.}} \text{ or } \frac{1}{\text{A.B.}}\right)$ be divided by the log light value (A) the slope is found, and can be expressed as an angle. The co-ordinates in the log graphs are $\text{Log } \frac{1}{\text{A.W.}}$ values, the abscissae Log A values; W (or B., as the case may be) being the constant in Weber's law.

The following table shows the range in logs of Weber's law with varying backgrounds, and the slope values and angles found in these ranges:—

TABLE XV—WEBER'S LAW RANGE (Chart T)

Screen	$\frac{\text{Log Sensitivity}}{\text{Log Illumination}} = \frac{\text{Range Log } \frac{1}{A\,W}}{-\text{Log A}}$	Slope	Angle
Velvet	$\frac{4{\cdot}87-0{\cdot}51}{3{\cdot}81+2{\cdot}4} = \frac{4{\cdot}36}{5{\cdot}95}$	0·73	36°
31 per cent. White	$\frac{3{\cdot}31-1{\cdot}92}{1{\cdot}26+0{\cdot}176} = \frac{1{\cdot}39}{1{\cdot}436}$	0·96	43° 48′
50 per cent. White	$\frac{4{\cdot}32-0{\cdot}45}{3{\cdot}64+1{\cdot}94} = \frac{3{\cdot}87}{5{\cdot}58}$	0·695	34° 48′
69 per cent. White	$\frac{3{\cdot}35-0{\cdot}04}{1{\cdot}26+2{\cdot}2} = \frac{3{\cdot}31}{3{\cdot}46}$	0·953	43° 40′
White	$\frac{3{\cdot}38+0\,16}{1{\cdot}23+2{\cdot}3} = \frac{3{\cdot}54}{3{\cdot}53}$	1·003	45° 6′

The succeeding table shows the logs of Table XV reduced to ordinary numerals.

TABLE XVI—WEBER'S LAW RANGE

Screen	Range of Sensitivities $\frac{1}{W\,A}$ or $\frac{1}{B\,A}$	Range of Least Differences $\frac{W\,A \text{ or } B\,A}{\text{Foot candles}}$	A Foot candles
Velvet	75000 – 3·3	0·0000132 – 0·3	0·000156 – 140·0
31 per cent. White	2026 – 84 (W)	0·00043 – 0·0118(W)	0·055 – 1·5
50 per cent. White	21000 – 2·85 (W)	0·000047 – 0·35 (W)	0·00023 – 87·5
69 per cent. White	2170 – 1·1	0·000457 – 0·896 (W)	0·031 – 160
White	2147 – 0·7	0·000414 – 1·4 (B)	0·06 – 200

(W) = White difference. (B) = Black difference.

For convenience a summary of the complete ranges investigated is shown.

TABLE XVII

Screen	Ranges of Sensitivities $\frac{1}{W\,A}$	Ranges of Sensitivities $\frac{1}{W\,B}$	Ranges of Least Difference W A	Ranges of Least Difference A B	Ranges of A (ft. candles)	Zero of Sensitivities A
Velvet	75000 −3·3	—	·0000132 −0·3	—	·000156 −140·0	·0000315
31 per cent. white	32000 −11	19200 −13	·0000312 −0·091	·000052 −0·073	·0002 −35·0	·00084 B
50 per cent. white	21000 −2·85	23200 −9·5	·000047 −0·35	·000043 −0·105	·00023 −87·5	·000032
69 per cent. white	9121 −1·1	900 −1·2	·000108 −0·896	·000145 −0·848	W ·00051 −160·0 B ·00021 −160·0	·00021 W
White	—	11700 −0·7	—	·000085 −1·4	·000276 −200·0	·00003

The normal shape of a curve dealing with a response to a varying stimulus is:—A gradual rise passing into a more or less steep slope, a rounded top, a more or less steep descent, passing by a less steep slope to zero. Doubtless the log summation curves should show this form theoretically, but some factors at work introduce difficulties. An inspection of the log graphs and tables will show that zero sensation is reached between 4·45 and 5·4 (A values), the sensitivity drop being from log 4·87 (black) and log 3·83 (black sector 69 per cent. screen) to infinity. Inevitably the fall is very steep and must approach a straight line, impossible to register with the means at one's disposal, since it meant an integration of sensitivity between 0·000156 and 0·00003 ft. candles. Moreover, correct judgment in these low illuminations is greatly interfered with by the intrinsic light production in the retina, which makes sensations very similar to those caused by real light differences.

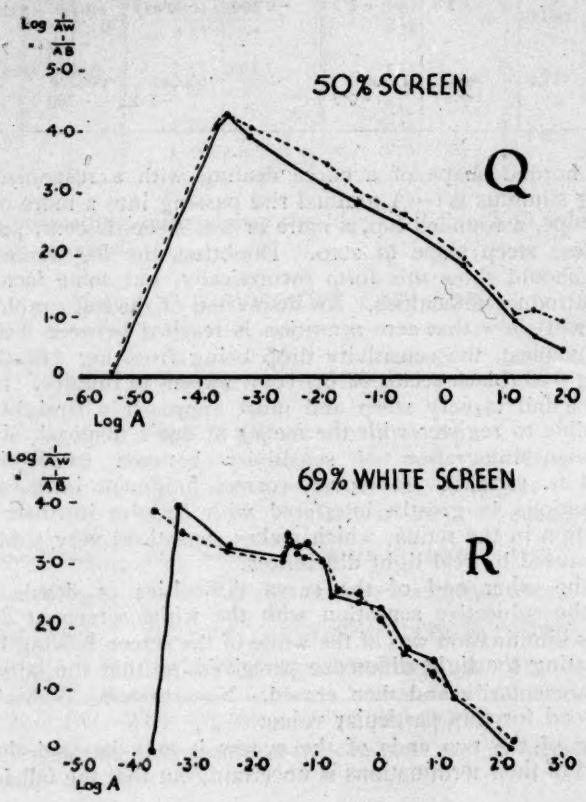
At the other end of the curve difficulties of dazzle arise. Here the subjective sensation with the white screen at 200 ft. candles illumination was of the white of the screen flowing in and obliterating the light difference perceived, so that the latter was seen momentarily and then erased. Nevertheless, Weber's law held good for this particular value.

Thus of the two ends of the curves it may be said that the method of their terminations is uncertain, but that the fall for low

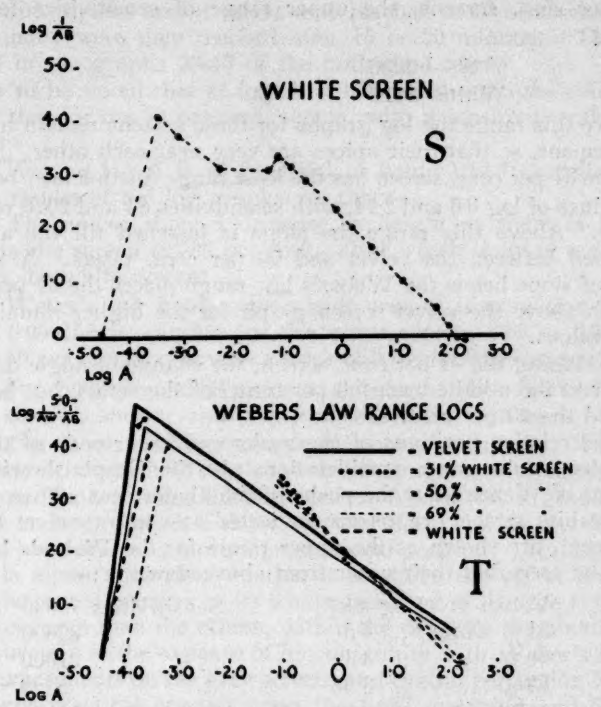
illuminations is very steep and that the decrease of slope for high illuminations is not marked, though shown best in the log curve for the 31 per cent. screen. It is assumed in Graph T that the final fall in sensitivity with low illuminations follows Weber's law, it cannot deviate greatly.

For the purpose of Weber's law the five graphs fall naturally into two groups according to the slope, one comprising the velvet and 50 per cent. screen graphs with slopes of 36° and 34°.8′ respectively, the other of the 31 per cent., 69 per cent., and white screens with slopes of 43°.48′, 43°.40′, and 45°.6′ (see Graph T and Table XV).

The velvet and 50 per cent. screens give the longest range for Weber's law, from the highest illumination used to the apices of the curves the law holds. Moreover, the ascents are nearly



parallel. If the value of the velvet screen line be taken in the same vertical line as apex of the 50 per cent. (Log A=4·36), it is found to be log 4·7, = 50000 sensitivity as against 21000 for the 50 per cent., rather more than twice as much.



If, similarly, the numerical value of the sensitivities of the differences of these two screens be taken corresponding to log A = 1·95, they are :—

Velvet screen 5
50% ,, 2·85

The middle term is given by A = ·1 (Log T.0), where the sensitivities are :—

Velvet screen 631
50% ,, 315

the difference being 50 per cent., as are the screens, the 50 per cent. screen giving a sensitivity value half of that of the velvet screen.

The 69 per cent. and the white screen are also practically identical in slope, the angles being 43°.40′ and 45°.6′ respectively. They are nearly identical in extent towards the lower illuminations, the difference being within the margins of error. But the range of Weber's law is much less than with the velvet and 50 per cent. screens, the upper range of sensitivities for this being:—

69% — 2250
White 2417

Above this range the log graphs for these screens remain in close agreement, so that their apices are very near each other.

The 31 per cent. screen has the least range for this law, between A values of log 0·6 and $\bar{2}$·74, with sensitivities 84 and 2026 respectively. Above this range the slope is lessened till the apex is reached between the velvet and 50 per cent. peaks. A similar loss of slope below the Weber's law range places the 31 per cent. graph above the velvet screen graph for the higher illumination (A) values.

Excluding the 31 per cent. screen, the change of angle does not occur at the middle term (50 per cent.) of the series, but between it and the 69 per cent. screen.

The relative positions of the peaks and lower ends of the five graphs require some consideration. In the Graph showing the extent of Weber's law the peaks of the 31 per cent., 69 per cent., and white screen graphs are indicated—those for velvet and 50 per cent. are shown as the upper range for the Weber's law. It will be seen that their order from above down is:—

Velvet	Log 4·87	Sensitivities 75000
31% white	,, 4·5	32000
50% ,,	,, 4·32	21000
69% ,,	,, 3·96	9121
White	,, 4·06	11700

the last two being as logs nearly equal.

But if a vertical section be taken at $\bar{3}$·5 position, corresponding with the 69 per cent. screen peak, it will be seen that the white screen graph is at the same level as the 69 per cent. graph. So that comparing these two graphs in different positions, it will be seen that they are always near each other and cross once—they may be taken as practically equal for any given illumination within their common range.

Light Adaptation.—With the exception of the 31 per cent. screen graphs, Weber's law holds at the lower ends of the graphs, corresponding to the higher illuminations, as far as the experiments were taken. As the middle of the room in which the

experiments were conducted was illuminated by daylight to about 10 to 20 ft. candles, the graphs for values of A above 20 ft. candles (log 1·3) become studies in light adaptation. As pointed out above, Weber's law holds for these illuminations except for screen 31 per cent. white. The great majority of the final light differences with screens except velvet were reached in 10 minutes, only occasionally were they reached after 15 or 20 minutes. This is shown in the graphs 23-40 of the individual tests.

It is to be noted that at log A = 0·05 all the graphs coincide except that for the 50 per cent. screen, with a sensitivity value of log $\frac{1}{A\,W}$ and log $\frac{1}{A\,B}$ of 2·0 = 100, A being 1·12 ft. candles.

The results of the log graphs are that:—

(1) The apices show a decrease in height as there is more white in the screen till 69 per cent., after which there is a slight rise for the white screen.

(2) Weber's law holds over a wide area of illumination from 140 to 0·000156 ft. candles for the velvet screen, 87·5 to 0·00016 for the 50 per cent. screen with a slope of 0·73 and 0·69 respectively.

(3) For the white and 69 per cent. screens the slope for Weber's law is steeper, shorter and practically identical with each other.

(4) The 31 per cent. screen graph behaves erratically. In the short extent in which Weber's law holds it agrees with the white and 69 per cent. screens almost exactly. Above this it gradually reaches an apex between those for the black and 50 per cent. screens, but not in any closely proportional position. At its lower end it is again anomalous in that it is above the velvet screen graph, so that it behaves in its whole extent more like the typical sensation curve than the others, within the range of illuminations used; but only at the expense of its conformity with Weber's law.

The experiments on the grey screens and central perception have no present practical bearing upon the light threshold and light difference as at present used. They have an interest inasmuch as they indicate that the amount and kind of response which exists with the black and white screens spreads in and meets somewhere between the 50 per cent. and 69 per cent. screens, and not at the 50 per cent. screen as might have been expected. That this is the case with the range of Weber's law, as well as the difference of slope, points to an essential difference in the reaction to small differences of stimulus with black and white backgrounds respectively.

In considering the two tests of light difference and light threshold there are some practical points upon which there is no general agreement, with the resultant that only vague comparisons can be made between different observer's results. It would seem

very important that standards should be set up, so that the tests should be as comparable as in the ordinary visual field or central vision tests. The following points require consideration:—

I. The size of the illuminated area.
II. The illumination, its kind and method of variation.
III. The distance of the observer.
IV. The duration of adaptation.
V. Daylight threshold tests.
VI. Standards of normality.

Speaking generally, these should be made to conform as measurements to the metric system; that is, they should be convenient parts or multiples of metric standards.

I. The size of the illuminated area. In the present experiments a sector of 0·75 cm. radius was used. Perhaps it would have been simpler to have chosen 1 cm. or 0·5 cm. as the radius, as in the annulus method. This aims at testing the foveal and parafoveal areas only. Ferree, Rand and Stoll (ref. *a*) intentionally use a much larger area, to include a portion of the field outside the parafoveal area. This they do following on their demonstration that this larger area is more sensitive per unit area than the more central portion. Granted this greater sensitivity, it would seem better to keep the inner and outer areas distinct in testing rather than use two areas of different sensitivities together in one test. The results of the field tests for dark adaptation would point to this method as useful for testing the field sensitivity apart from the central region.

II. Should the illumination in the threshold test be reflected from the test object, as in Forster's original method and as used in the present work, or be transmitted through it as in Nagel's apparatus? The writer used reflected light in all these experiments, largely on the score of expense, the apparatus was easily and cheaply constructed. That it answered its purpose is shown by the range of Weber's law found. For the threshold test electric light is best, it can be graduated by an iris diaphragm and smoked glasses.

For the light difference test daylight answers admirably, avoiding the use of a room especially prepared, which is impracticable for most clinicians. But for comparable results a photometer is necessary.

A two metre square white screen is necessary to give the necessary uniform background in the light difference test if the distance is one metre.

The light adaptation tests were made in diffuse daylight in the consulting room, with the white screen about 1·25 metres from the window, this answered excellently. In this country it would be unusual to get more than 150 ft. candle daylight illumination of

the screen. However the latter be lighted, 150 ft. candles would be quite enough to give a reliable result without dazzle, the latter making the results uncertain at high illuminations.

III. In the present work one metre was the distance between the observer and the object. This is a simple measurement and greatly eases calculations.

IV. The time allowed for adaptation is important; half-an-hour should be allowed for dark adaptation, a quarter-hour for light adaptation. Most observers agree that the greater part of central dark adaptation occurs in half-an-hour, but beyond this a slight gradual rise continues for a further 40 or 60 minutes. An inspection of the individual graphs for the velvet screen confirms the steady rise in most cases during the half hour given to each experiment, while the conformity with Weber's law in this series gives a further reason for considering this time sufficient; anything short of this will run a great risk of error. Moreover, it is very important that any clinical test should be reliable, the implications are so important. The steady rise during the half hour has been confirmed in other cases than the writer's eye, in searching for a normal standard, under the same conditions as these experiments.

The question whether any safe deduction can be made from an observation made on the light threshold under ordinary daylight is difficult. The graphs illustrating Weber's law show that this obtains with a velvet or white background at high illuminations, in a normal eye the constant W (or *B*) holds. It is this constant which is measured in Percival's disc test, the light factor being omitted. But the crucial question is whether the sensitivity continues to follow this law in the lower illuminations. Certainly this is not so always, as in a glaucoma case in which by the ring test in daylight the threshold was normal, but a test in the dark room during half-an-hour showed a very great diminution of threshold sensitivity. So that no safe deduction can be made from a normal threshold result in daylight; greatly reduced illumination is necessary.

V. As in other functions of the body, there is no hard and fast normal in the light threshold. Even a moderate departure from the usual may not be pathological, as long as the sensitivity which exists is sufficient for the ordinary duties of life under reduced illumination. The speed of adaptation, and the consequent manner in which sensitivity rises, may not affect the ultimate threshold reached, but may be most important in elucidating difficulties from which people suffer. Yet it is the final result which is the criterion of the threshold. It is evident that there are many aspects of this subject, but a preliminary to their accurate investigation is the adoption of standards, so that the work of different observers should be co-ordinated.

Comparison of Peripheral and Central Adaptation

(*a*) In each there is a lowering of sensitivity at the onset of decreased illumination, followed by an increase after a lapse of time; usually 10-15 minutes for the field, 30 minutes for central perception with the velvet screen, less with those having a proportion of white in the screen.

The essential differences between these two sets of tests are:—

(*b*) In the field test the object is moved, in the central it is fixed; in the field test the increased sensitivity is registered spatially, in the central as an increase in intensity of sensation. But it should be noted that, if any one spot in the field be taken, this would show an increase in intensity of sensation, as shown in the graphs A-I for the adapted eye, as compared with the graphs 1-17.

(*c*) In the field test the object has a fixed proportional value, in the central test this is altered as the adaptation progresses.

(*d*) While the central adaptation follows to some extent Weber's law, no mathematical formula was found to express the field adaptation.

(*e*) A tendency to exhaustion was found in the field which was never noticed in the central tests, the portion of the field tested extending to 45° from the line of vision. This is striking, for this was the 3/1000 field, which is relatively the most stable portion of the field in glaucoma and cavernous atrophy, thus contrasting with the tendency to exhaustion under physiological conditions.

If it be assumed that in the field adaptation tests the exhaustion is in the retinal visual elements, and that in glaucoma and cavernous atrophy the resistance is in the nerve fibres, a feasible explanation is found.

In conclusion the writer wishes to express his thanks to Professor Newman, D.Sc., of the University College of the South West, for much help and advice during the conduction of these experiments.

A CASE OF UNILATERAL ANOPHTHALMOS WITH A CYST

BY

KANJI KANDA

JAPAN

ANOPHTHALMOS is one of the rare congenital anomalies in which, in spite of the name, a small or rudimentary eyeball is found usually in the lower lid. It is bilateral in almost all cases; and if the orbital integument is prolonged and covers the partially developed eyeball, then it is called cryptophthalmos.

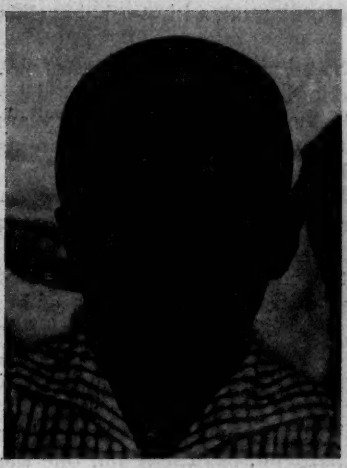


FIG. 1.

Before operation, showing the projection of the skin of the left lower lid.

FIG. 2.

After operation, with the insertion of an artificial eye into the conjunctival sac.

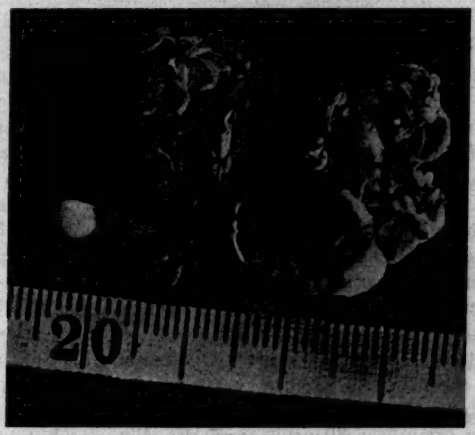


FIG. 3.

The excised ocular cyst. The white corpuscle may be the remains of the crystalline lens.

In the writer's case, the patient K. K. was a little boy of five years old, in whom the anomaly was unilateral, with normal eyelids and conjunctival sac.

Family history.—His father is 48 and his mother is 41 years old. He has five brethren. The eldest daughter is 18, the second sister is 14, the third is 11, the fourth is 9, the younger brother is 3 years old, and his elder brother died at 3 years of age. The parents are not related and the other brethren are all healthy.

The parents brought the child to me on July 25, 1932, but operation was postponed till December 15 of the same year on account of family affairs.

History.—Before the birth of the child, the mother stumbled and fell down at the water closet and struck the lower part of her abdomen against an edge of the pot. This accident occurred in the fourth month of pregnancy, but there was no grave consequence, and the child was born easily at term. At the time of birth, this anomaly was already present, also an atresia in another part of the body. This latter anomaly was operated on soon afterward by an orthopaedic surgeon, but the ocular one was left as it was without operation.

State on admission.—The child is apparently well nourished, although he seems to be a little weaker than the ordinary children of the same age. There are no anomalies in other parts of the body. Hearing and speech are both normal. There is no appearance of mental weakness. The circumference of the cranium is 48 cm. X-ray examination of the breast and the abdomen reveal no affections.

The right eyeball is abnormal, a convergent squint of low degree is present, together with micro-cornea, of which the vertical diameter is 8 mm. and the horizontal 6 mm. so that it is longitudinally oval in shape. Probably the eyeball itself is somewhat smaller than normal. The iris is partially defective in its lower part, showing a coloboma of this membrane; and there remains a network of fine filaments of a persistent pupillary membrane across the longitudinally oval pupil. There is neither cataract nor opacities of the dioptric media. In the fundus there can be seen a large area of congenital coloboma of the choroid which extends from the lower edge of the papilla to the region of the ora serrata. Probably this choroidal coloboma is continuous with that of the iris above mentioned. There is a gross lateral nystagmus of the globe. The eyelids are normal, and the length of the lid along the margin estimates 30 mm., and the distance between the inner canthi of both eyes is also 30 mm.

In the left eye, the lids and the conjunctival cul-de-sac only are normal. The lids have the same size as the right ones and the conjunctival sac is quite empty, so that the upper and the lower

fornices are directly continuous with each other. The depth of the conjunctival sac is estimated at 19 mm.

In the left lower lid, as it is seen in the accompanying figure, there is a projection of the skin under which the rudimentary eyeball is hidden. Although the cyst is mainly obscured by the skin of the lower lid, it is also partially covered by the lower palpebral

FIG. 4.

A part of the coat of the cyst. Low-power magnification. A. Proliferation of the connective tissue and its hyaline degeneration in the internal part of the coat. B. A distinct ring-shaped deposition of lime in the wall of a blood vessel. C. Fibres of coarse connective tissue in the outer coat. D. Infiltrations of poly- and mononuclear leucocytes. E. Sections of the blood vessels filled with red cells. F. Granular and linear deposits of lime in the parts where there is distinct hyaline degeneration of the connective tissue, together with proliferation of the latter tissue in the internal layer of the coat.

conjunctiva. The skin of the lower lid is a little prominent and tinged with slightly bluish colour. The brows are normal on both sides.

On palpation, both the upper and the lower margins of the left orbit are normal, and the hidden eyeball moves more or less freely within the orbital cavity. It also moves freely with the motion of the skin of the lid, and is felt on palpation to be somewhat softer than the right eyeball and seems as if there were a small rubber ball under the skin. When it is pressed upward

and a little backward with the finger from above the skin, the bottom of the empty conjunctival sac is projected at the same time. It is impossible to put an artificial eye into the conjunctival sac, because of the projection of the wall of the sac.

Operation.—The operation was done on December 15, 1932, under local anaesthesia with 1 per cent. solution of neocaine. I

FIG. 5.

High-power magnification. A. Proliferation of the connective tissue and its remarkable hyaline degeneration in the inner layer. B. A distinct ring-shaped deposit of lime in the whole section of the coat of the blood vessels and the red blood cells therein. C. More or less scattered cell infiltrations. D. Linear and reticular deposits of lime. E. Stratified deposits of lime, under which a mass of the same deposition and cells which contain haemosiderin are also seen.

preferred the following method of removal of the hidden eyeball, which I assumed to be the best. An incision was made in the skin of the projection, leaving the conjunctival sac quite intact for the purpose of insertion of an artificial eye into it after the operation. The incision was 2 cm. long, about 5 mm. from the lid margin and parallel to it. The cyst was soon reached on opening the subcutaneous tissues. It was a soft cyst full of fluid and was attached by coarse adhesion to the lower wall of the orbit. The intra-orbital tissues surrounding the cyst were very poorly developed. There were no insertions of the ocular muscles upon

the surface of the cyst. The cyst seemed to be composed of three chambers by a slight stricture. Among these three parts, the right was the biggest, the left was the next to this and the middle was the smallest; and this was rather hard and seemed to be the root of the whole cyst which was in tough attachment partly with the periosteum of the upper wall of the orbit and partly with the subconjunctival tissue of the upper palpebral conjunctiva, so that

FIG. 6.

Low-power magnification. A. Arrangements of columnar cells of the endothelium of a duct. B. Lumen of the duct and the mucous fluid in it. C. Section of a blood vessel. D. A thick layer of sclerotic fibrinated connective tissue.

when the cyst was pulled forward with forceps and a little downward, the upper lid and its palpebral conjunctiva were pulled simultaneously in the same direction. This hard attachment was divided with scissors. On cutting, there was a firm resistance, and the cyst was ruptured. A transparent corpuscle of about 5 mm. in diameter came out from the orifice of this cutting with a yellowish muco-serous fluid like bile juice.

After the excision of the cyst, the cavity in the orbit and the wound were tamponaded. Six days later the tamponade was removed and the ends of the wound were sutured carefully. And six days later the suture was removed and the union of the wound was complete. An artificial eye inserted into the conjunctival sac maintained its position. The right eye, tested with

Löhlein's Test Types for children, resulted in 0·3 with a slight improvement by a concave spherical lens. The acuity of vision of the same eye when tested on February 12 last year, was 0·2 with improvement to 0·3 by a −1·5 D. spherical lens.

Pathological observations.—The cyst is coated with a comparatively thick wall of greyish-white appearance and a tendinous lustre. At the orifice of the middle part of the cyst which was made by the operation, the inner surface is seen as a dark brown coat. The cyst was fixed in 10 per cent. solution of formalin and after having been embedded in celloidin, was sectioned. Sections were stained with eosin-haematoxylin, together with van Gieson's as well as Planter's stains for elastic tissue, using resorcein-fuchsin; an iron reaction for the haemosiderin pigment was also tried.

The wall of the cyst consisted roughly of two layers, of which the outer one was composed mostly of adipose tissue and the inner of old connective tissue. The proliferation of the connective tissue was very remarkable, and some parts of the preparations showed hyaline degeneration. In and around these places where there was hyaline degeneration, there was also a deposition of lime in the shape of a network or in a little mass. In the wall of the small blood vessels, there was also a ring-shaped deposition of lime. Around the blood vessels or independently of them, there was a small extent of cell infiltration, in which lymph cells, plasma cells and polynuclear leucocytes were mostly found, and some mononuclear white cells, surrounding which were pigment cells containing yellowish or mahogany-brown pigment. These pigments were positive in reaction to iron. The polynuclear leucocytes formed a dense aggregation in the connective tissue of the adipose tissues of the outer layer.

In the inner layer of the wall of the blood vessels, there was degeneration so that the coat was atrophied on account of the pressure of the proliferation of the connective tissue as well as hyaline degeneration together with the deposition of lime, consequently the calibre of the vessels was diminished. In the outer layer of the walls of the blood vessels, however, an infiltration of polynuclear leucocytes was seen and the capillaries were engorged.

In the inner wall of the cyst, there were also pigment cells which contained a yellowish and mahogany-brown pigment, which gave the iron reaction so that it was supposed to be haemosiderin. These pigment cells were seen here and there around the deposition of lime and separately from the latter too.

The elastic tissue was seen only in the middle part of the wall of the cyst between the inner and the outer layers, it was very scarce in amount and its fibrils were quite faint. This tissue was

atrophied or almost extinguished in those parts where there was evident degeneration and deposition of lime in the walls of the blood vessels.

In the innermost part of the inner layers of the wall of the cyst, there was a single coat of columnar cells, in which the nuclei were either columnar or spindle-shaped and unpigmented. In the inner layer, there was nervous tissue which was atrophied by the pressure of the proliferation of the connective tissue and almost extinguished. There could be seen more or less scattered segments of the inner as well as of the outer granular layers of the retina.

Considering these pathological observations as above mentioned, it can be seen that two aspects of new and old changes of inflammation are seen at the same time throughout the preparations. As for example, polymorphonuclear leucocytes are a sign of a recent acute inflammation on the one hand, and the evident proliferation of the connective tissue, its hyaline degeneration and the deposition of lime are that of a long standing chronic inflammation on the other hand. It is, however, impossible to certify from these observations whether the older alterations are those of the embryonic stage or not—say those present at the time of birth,—for the child is now five years old so that the cyst has existed for a long period. The changes showing recent inflammation, may be considered as secondary and have nothing to do with the occurrence of this anomaly.

As is evident from the history, I suppose that the development of the ocular structures of the child had been obstructed by the accident of his mother during pregnancy. As an anophthalmos, this is an interesting case in which it is seen only on one side which has the normal lids and conjunctiva. The excised ocular cyst, though it does not show the proper structure of an eye in these preparations, is considered to be a rudimentary eyeball which is the same as that of a cryptophthalmos. The state of the child is largely improved by the operation as well as by the insertion of an artificial eye into the conjunctival sac.

For the kindness of making histological preparations from the cyst and information upon the pathology, I am indebted to Professor Dr. N. Kubo, chief of the department of pathology of the Taihoku Medical College and Professor Dr. M. Kudo of the same department (March 14, 1935).

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ANNOTATION

Publicity

The manner in which certain matters of medical interest receive publicity in the columns of the lay press has for some time savoured of revelation, a distinction much sought after by those papers which may be designated 'sensational.' The offence, annoyance and sometimes amusement that these effusions of fiction and sentiment cause us are but secondary to the menace that they have become in playing upon the simple belief of a large number of the public. In many instances the hopes of sufferers from the particular disease in question are falsely raised only to be tragically lost on learning the true facts. It is evident that a large majority of such cases have been prompted to seek fresh advice entirely by the extravagant and ill-balanced accounts of some therapeutic measure recorded in the popular press. The articles that appear in the press generally concern therapeutic agents or methods that have been revived after a varying period of oblivion or are about some form of treatment that is new and has not yet survived a term of critical trial.

The avenues through which the reporter obtains his news probably account in some small part for the inaccuracy of the published articles but in a large degree he himself is to blame for allowing invention, fantasy and soft sentiment to substitute for those scientific facts which he has failed to comprehend or has considered dull 'copy.'

The channels through which news is obtained are in some cases from the lay administrative staff of a voluntary hospital whose publicity they feel, with the best intentions, may have some value as an appeal for funds. Other sources are through the patient or his relatives, who in a moment of misguided gratitude give a garbled story which is further elaborated by the press reporter. Articles in current medical journals, papers and speeches read by medical men appear in the press as mutilated abstracts shorn of their context and of the background of the scientific contribution in question and thereby are so distorted as to convey in many instances a wrong meaning. In recent times the distastefulness of these press publications has been increased by the mention of the names of medical practitioners in connection with the current topic described. Publicity of this kind is as offensive to the individuals concerned as to the profession as a whole. We should therefore be ever watchful that we are not beguiled into conveying information on professional matters in conversation or on the telephone to lay persons who may use it for press purposes.

When the names of medical practitioners are thus dragged in or a press interview is falsely suggested it seems desirable that stern action should be taken against the offenders, but otherwise a policy of dignified silence would be more proper and we hope eventually effective.

It is hoped that in course of time public disgust for that section of the press which violates the laws of scientific truth and accuracy will solve the problem and with the cessation of the supposed demand for this type of news such pseudo-scientific effusions will disappear for ever.

The problem of enlightening the public on matters of medical and scientific progress through the medium of the press presents many difficulties. If such is considered desirable, and there is a good case for public education in matters of preventive medicine, hygiene and public health, it would appear that in the interests of professional conduct these articles should be contributed by some recognized body of the profession rather than by individuals. It is very questionable whether it is wise to attempt the instruction of the layman on medical matters other than the elementary facts about the maintainance of good health and some knowledge of first aid. The home medicine chests and books containing directions for domestic treatment have probably been a great source of public danger to many who have been victimized by their contents. The incidence of general peritonitis, often with fatal consequences, caused by the liberal administration of castor oil in cases of appendicitis, and seriously impaired vision caused by the attempts at removal of foreign bodies by well meaning but unsuitable persons are cases in point.

COUNCIL OF BRITISH OPHTHALMOLOGISTS

Revised Report on Standard Illumination of Snellen's Types used in Testing the Vision of Candidates for Public Services, 1935

THE Council appointed the following:—Sir John Parsons (Chairman), Mr. J. S. Dow (Secretary of the Illuminating Engineering Society), Mr. N. Bishop Harman, Dr. R. Lythgoe (Physiological Department of University College), Mr. W. H. McMullen, O.B.E., Mr. Leslie Paton, and Mr. Malcolm Hepburn, to be a Committee to revise the former report of the Council on Standards of Illumination of Snellen's Test Types.

The effect on visual acuity of variations in the illumination of test objects has been the subject of a series of careful investigations

since the time of Tobias Mayer (1754). The scope of these investigations has been greatly extended in recent years due to improved experimental technique, and the effects of illumination on visual acuity are now known for a wide range of values. Given good conditions there is no doubt that the acuteness of vision improves with increasing illumination up to values encountered in daylight in the open air; it is desirable therefore to fix an arbitrary value as the standard. A value of ten foot candles is recommended, and this figure has the advantage that it is in the region of a well-lighted interior at night. Small variations from this figure will not have a great effect on visual acuity, and are not so serious as the errors commonly found in the dimensions of test types. A fall of say five foot candles from the recommended value will lead to a greater change in visual acuity than a rise of five foot candles.

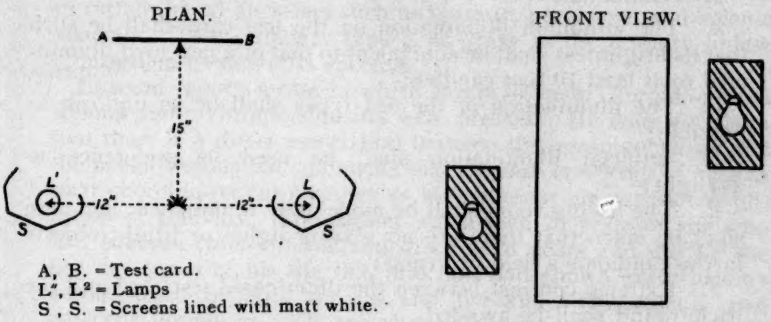
There is, however, no doubt that this minimum is by no means always ensured under the actual conditions in which the testing of candidates for military or other public services occurs. Apart from the fact, which should be borne in mind, that the test types often do not conform to Snellen's criteria, they are frequently dirty, thus diminishing contrast, are varnished, thus giving rise to disturbing direct reflection of light, and are viewed under very great variations of daylight, in rooms often ill-suited for the purpose.

It is possible to lay down precise and simple rules for the efficient illumination of test types, and we see no reason why these rules should not be generally adopted. For the public services it is in our opinion unfair to the candidates, and detrimental to the services themselves, that the examinations should take place under unsatisfactory, and often hurriedly improvised, conditions. The testing of visual capacity is now an essential part of the physical examination of candidates for a large number of the public services, such as the Navy, the Army, the Mercantile Marine, the Indian Civil Service, and so on. We are of opinion that these tests should be conducted under approved conditions, and that this object would be best attained if the examinations were held at properly equipped centres.

We fully recognize that variations of visual acuity arise from many causes other than the actual illumination of the test types, such as the condition of retinal adaptation, contrast between the test object and its background, the size of the pupil, lateral illumination, and so on. We think, however, that these effects can be minimized sufficiently for practical clinical purposes if the testing takes place in a moderately well illuminated room, with the test types efficiently lighted, and with the careful elimination of any glaring lights or bright objects from the candidate's field of vision.

We consider that the requirements are sufficiently well-satisfied by the following means:—

Two 25 watt internally frosted (Pearl) lamps are fixed vertically 15 inches in front of the plane of the test card, one on each side, at a horizontal distance of 12 inches from the vertical plane normal to and bisecting the card. One lamp is placed higher than the other, one being opposite the junction of the upper and middle thirds of the card, the other opposite the junction of the middle and lower thirds. Opaque screens, preferably cylindrical, having a matt white interior, should be mounted behind the lamps so as to direct the light on to the chart and also prevent direct light from the lamps reaching the candidate's eyes.



A, B. = Test card.
L^1, L^2 = Lamps
S , S. = Screens lined with matt white.

This method ensures:—

1. Sufficient illumination. With new lamps the illumination on test types will be of the order of 14 foot candles. The ordinary variations of current, deterioration of lamps, and the darkening of the test card with age will not reduce the brightness of the test card so illuminated to a value less than that of a perfectly white surface receiving an illumination of 10 foot candles.

2. Sufficient uniformity of illumination. Whilst we are aware that the same result can be achieved by the employment of properly designed and carefully placed reflectors we have had to recognize in making these proposals that the testing of visual acuity must often be carried out in circumstances which do not admit of the use of special lighting arrangements, requiring technical skill in their installation or upkeep. We have, therefore, endeavoured to prescribe a method of ensuring the necessary illumination which is simple to erect, is not liable to become deranged by subsequent treatment, and which enables ordinary lamps on the market to be employed.

Where electric light is not available a similar arrangement can be installed, using gas lamps.

Daylight Illumination.—There is no theoretical objection to the use of diffuse daylight so long as the illumination on the test types is adequate, *i.e.*, does not fall below 10 foot candle. In cases of doubt, it would be necessary to apply tests requiring the skilled use of some form of photometer. We are therefore of opinion that, in order to secure uniformity and comparable results, artificial illumination should in general be used, and invariably in testing for the public services.

We therefore make the following recommendations:—

I. *The Test Types.*—The test types shall be of the dimensions laid down by Snellen, and printed on a matt white surface.

II. *Illumination.*—

a. The minimum illumination on the test card shall be such that its brightness shall be equivalent to that of a new card illuminated to at least 10 foot candles;

b. The illumination of the test types shall be as uniform as possible;

c. Artificial illumination shall be used in preference to daylight;

d. The testing room shall be moderately illuminated, and care shall be taken that there are no glaring lights or bright objects in the candidate's field of vision;

e. Extreme contrast between the illuminated test card and the background shall be avoided.

III. *Method of Lighting.*—

a. The method of lighting described in this report shall be in general adopted.

b. This method shall be made compulsory for sight testing in all public services.

ABSTRACTS

MISCELLANEOUS

(1) **Lawson, A. and Bellingham Smith, E. (London).—Agranulocytic anaemia with retino-choroidal lesions.** *Trans. Ophthal. Soc. U.K.*, Vol. LIV, p. 290, 1934.

(1) Agranulosis is a form of severe leucopenia, the disappearance of the polymorpho-nuclear cells being a special characteristic. Other granular white blood cells, the eosinophils and mast cells

also disappear in the terminal stages of the disease while the red cell-count, haemoglobin and platelets are little affected. There are possibly phases in which the granular cells are either greatly reduced or replaced by primitive types. This disease seems to be commoner in America than in England, and affects females more frequently than males. Two varieties have been noted:—(*a*) A primary idiopathic, malignant form which is rapidly fatal. Septic ulcerations of the mucous membranes especially the mouth, pyrexia and extreme prostration are clinical features. (*b*) Agranulocytopenia as a secondary manifestation occurs, severe general toxaemia from pansinusitis, pneumonia, hepatic abscess, septicaemia, osteomyelitis and poisoning of the bone marrow by metallic poisons, and prolonged X-ray or radium exposure; also in certain blood disorders such as aplastic, pernicious and splenic anaemia. The secondary type is as grave as the primary unless appropriate treatment is effective.

Lawson reports a case in which severe bilateral choroido-retinal lesions and a chronic sinusitis were present. He does not claim that there is a direct association between the agranulocytosis and the ocular lesions but comments that the case is worthy of note as such choroido-retinal changes as were present are a rare complication of sinusitis. The patient was a man 75 years of age who had suffered from chronic sinusitis for 23 years and during the last two years of his life this infection had shown exacerbations accompanied by sore throats and pyrexia. The macula and adjacent fundus in each eye showed degenerative and atrophic processes which had produced considerable structural damage. An examination of the blood revealed a severe leucopenia, 2,000 white cells per c.mm., and the polymorpho-nuclear cells reduced from the normal 63 per cent. to 31 per cent. of which only 1 per cent. were normal polymorpho-nuclear cells, the remainder presenting an immature appearance, either with a band nucleus or a single nucleus (metamyelocytes). Acute tonsillitis, pyrexia, thrombosis in the right leg, delirium, signs of cardiac failure and an ultimate disappearance of all polymorpho-nuclear and other granular cells from the blood, ended in death.

Bellingham Smith in discussing this case suggested that it was probably a primary agranulocytic anaemia with recurrences during which infection in the upper respiratory passages flared up.

The author regrets that the patient would not submit to differential blood counts at an earlier date in his illness. Had the diagnosis of agranulocytic anaemia been made in time injections of pentose nucleotide 0·7 grms. daily might have saved his life by restoring the normal number of healthy polymorpho-nuclear cells to the blood.

H. B. STALLARD.

(2) **Spaeth, Edmund B. (Philadelphia).—Swelling of the nerve heads with arachnoiditis and unusual changes in the visual fields.** *Arch. of Ophthal.*, August, 1934.

(2) Spaeth's case is of interest because of the field changes which bore a close resemblance to those found in chronic glaucoma. In the right eye there was an arcuate scotoma passing down from the blind spot, and joining a quadrantic loss of field in the lower nasal segment. In the left eye there was loss of nasal field and later some enlargement of the blind spot which however did not "break through." The patient, who was free from glaucoma, suffered from headache and papilloedema, at first in the right eye only, and later in the left eye also. Operation showed marked dilatation of the right anterior and middle cerebral arteries and the right internal carotid artery, with less marked changes in the vessels of the left side. There were patches of arachnoiditis where the vessels adhered to the meninges and the vaginal sheath of the right optic nerve was markedly dilated. The author attributes the field changes to "indirect extra-ocular pressure applied to the nerve trunk itself." The effect of this pressure was to interfere with the function of certain nerve fibre bundles and also to interfere with their blood supply and so produce an arcuate scotoma.

F. A. W-N.

(3) **Corrado (Genoa).—The problem of Leber's atrophy. (Sul problema etiologico dell'atrofia eredo-familiare del nervo ottico. Malattia di Leber).** *Ann. di Ottal.*, December, 1934.

(3) Corrado reports a very interesting family history with a tree showing eight members affected in four generations. Generally the disease affects the males, the females transmitting the taint to the male descendants, but being themselves healthy. In one individual, daughter of the third generation, who showed the disease in a somewhat irregular form and also transmitted to a son and daughter, the descent was unusual.

In searching for a possible cause for the atrophy, the author obtained skiagrams of the skulls of the affected members of the family and others, and noted the sella turcica to be of abnormally small dimensions, but this condition appeared in the healthy members of the family as well as in those who showed atrophy. It cannot, therefore, be regarded as being the chief cause of the condition, though it may have some bearing on it.

HAROLD GRIMSDALE.

(4) **Juler, F. (London).—A case of blindness after N.A B.** *Brit. Med. Jl.*, November 3, 1934.

(4) After pointing out that blindness was early recognized as a complication of the administration of drugs of the pentavalent

group of organic arsenic preparations, **Juler** reviews the evidence for injury to the optic nerve as the result of using a drug belonging to the trivalent group. Very few cases of blindness can be traced, and the usually expressed opinion has been that the blindness was due to a syphilitic lesion of the nerve, possibly precipitated by the use of the drug.

He reports a case of his own:—A woman, 46 years of age, with no previous eye trouble, rapidly went blind in both eyes fifteen days after a course of 6 doses of N. A. B., used in routine quantity. Two days after the loss of vision, both discs were white with hazy edges, and there was some narrowing of the retinal vessels. One eye could perceive light, the other was blind. The fundus state and vision remained permanently as when first seen. Although in a somewhat toxic state, a rash was the only other suggestion of salvarsan poisoning, and the case is reported as one of rapid bilateral loss of vision after the administration of N. A. B., although it is admitted that there is no certain evidence that the drug itself was responsible for the damage to the optic nerves.

R. C. DAVENPORT.

(5) **Hope Robertson (Wellington, New Zealand).—Hemangioblastomatous cyst of the retina.** *The Australian and New Zealand Journal of Surgery*, Vol. IV, p. 55, July, 1934.

(5) **Hope Robertson** reports a case of bilateral haemangioblastomatous cyst of the retina in which a similar tumour was successfully removed from the cerebellum.

The literature is fully reviewed, and the condition now usually associated with the name of Lindau, is discussed.

The case reported was a boy, 16 years of age, who four months before being seen had had an attack of headache and vomiting. The fundi showed the typical appearance of blood vessels and cysts—small in the right eye, much larger and associated with retinal detachment in the left eye. Four months later the cyst in the right eye was much enlarged, and some retinal detachmen. was apparent.

Later, definite evidence of intra-cranial disease appeared, although it did not absolutely point to a cerebellar lesion. In view of the ocular lesion, however, a surgical exploration of the cerebellum was made, and the soft tumour found in the left cerebellar lobe was removed by a diathermy knife, and the dilated vessels coagulated.

Section showed the tumour to be haemangiomatous in nature. After a stormy convalescence recovery was complete, though of course the ocular lesions remained.

R. C. DAVENPORT.

(6) **Pillat, Dr. A. (China).—Fundus changes in acute polyarthritis.** (Ueber Augenhintergrundsbefunde bei akuter Polyarthritis). *Wien. Klin. Wochenschr.*, March 8, 1935.

(6) As the result of careful fundus examination of cases of acute polyarthritis Pillat comes to the following conclusion. The majority of these cases shew a choroiditis mostly in the peripheral portions and these can be divided into four classes.

1. Cases with only a few patches in the periphery of one or both fundi.

2. Cases in which the patches are arranged in groups or in lines, also mostly in the periphery.

3. Cases with active choroidal patches.

4. Cases in which the distribution is similar to that seen in miliary disseminated choroiditis.

As regards the aetiology he discusses four possibilities, syphilis, metastatic non-tuberculous, metastatic tuberculosis, an unknown cause. Syphilis he excludes positively. Metastatic non-tuberculous he considers a possibility, but in view of the fact that all stages from single patches to a miliary disseminated form have been found, and, further, that almost all the patients were sensitive to tuberculin, he regards these cases as probably due to a metastatic tuberculosis, or, failing this, to an unknown cause. He asks for further observation of such cases.

A. H. LEVY.

(7) **Mayer, Leo L. (Chicago).—Use of the fundus colorimeter.** *Arch. of Ophthal.*, August, 1934.

(7) The fundus colorimeter is really a disc colorimeter and should be of considerable service in the diagnosis of the degree of pallor in cases of optic atrophy. Mayer gives details of construction of the instrument from which it would appear that a wedge of a reddish colour is placed above the source of light in an electric ophthalmoscope. The colour of light entering the patient's eye is controlled by movement of the wedge, which movement is continued until the whitish disc of light projected on to the pupils begins to appear reddish. When this occurs a reading is taken from an arbitrary scale attached to the wedge and an indication of the degree of pallor of the optic disc is obtained. In the use of such an instrument, there are various precautions to be taken. Thus, the patient's pupils should be dilated, the candle power of the lamp bulb should be checked by a photo-electric cell and the same observer should always make the observations.

F. A. W-N.

(8) **Hard, G. and Hardy, W. F. (St. Louis).—Preliminary report on orbital tumours.** *Amer. Jl. of Ophthal.*, Vol. XVII, p. 18, 1934.

(8) **Hard and Hardy,** the authors of this paper, give a brief review of the differential diagnosis of new formations in the orbit. They report 7 cases. One of these was a mixed tumour of the lacrymal gland in a male, 47 years of age, who, after excision of an encapsulated neoplasm, suffered a recurrence and eventually required orbital exenteration.

Another case illustrated the necessity for removing a piece of tissue large enough for pathological diagnosis when undertaking a biopsy. In this case the patient was a coloured woman and her positive Wassermann reaction was ignored. The pathological report of the tissue excised was a glioma of the optic nerve. The main mass of the neoplasm was then removed by a Krönlein operation and proved to be chronic inflammatory tissue. The eye was left blind and squinting. This unfortunate result also affords an example of the necessity of persevering with anti-specific treatment for a reasonable time before submitting such a case to more drastic surgical measures.

Hudson's statistics are quoted, that 62 per cent. of cases of primary tumour of the optic nerve are found before the 10th year, and 90 per cent. before the 20th.

A case of perineural fibroblastoma of the optic nerve is described.

H. B. STALLARD.

(9) **Pressburger, E. and Sommer, I. (Vienna).—On the influence of labyrinthine stimulation on the visual field. (Ueber die Beeinflussung des Gesichtsfeldes durch labyrinthäre Reize).** *Arch. f. Ophthal.*, Vol. CXXXIII, p. 352.

(9) **Pressburger and Sommer** examined patients with normal and pathological excitability of the labyrinth, and normal and abnormal fields, with the galvanic and faradic currents and by the cold caloric test, and they found that on passing the galvanic current from ear to ear a temporary contraction of the fields occurred, provided that the ear that was tested reacted well and vertigo appeared; where there was no reaction to the current the fields were unchanged. In two out of three cases with a central or paracentral scotoma, the scotoma was larger after the application of the current. The normal or pathological condition of the ear was of importance only in so far as normal or abnormal excitability of the ear was present.

A similar result was obtained on syringing the ear with cold water; the alteration in the fields depended on the intensity of the vertigo produced.

As a control they employed the faradic current, which does not affect the labyrinth; with it there was no change in the field.

It was also noted that in some patients there was blurring of the vision at the height of the labyrinthine stimulation, but no change in accommodation was observed.

This contraction of the fields, which in none of the cases persisted after the labyrinthine stimulation ceased, must be regarded as a phenomenon of labyrinthine vertigo. It is not due to any immediate effect on the optic nerve or its centres, or the induction of nystagmus, or to an alteration in the volume of the retinal vessels which were examined. It is explained on the view that the labyrinthine stimulus is transmitted to the hypothetical cortical centre of the labyrinth and thence, among other centres, to the visual centre, which is involved on both sides.

THOMAS SNOWBALL.

(10) **Finlay, C. E. (Havana).—Visual field defects in pregnancy.** *Arch. of Ophthal.*, August, 1934.

(10) **Finlay** read a paper on this subject at the International Congress of Ophthalmology in 1922, detailing his findings in 32 cases. The present paper concerns the examination of 108 cases. 67 per cent. of these showed definite bitemporal loss of field, 21 per cent. showed no field changes, and in 12 per cent. the findings were doubtful. There was some tendency to limitation of the field loss to a quadrant and no tendency to concentric contraction except in a few cases which were tested with colours. The bitemporal contraction was more marked with small objects (1/330) in the later stages of pregnancy and in multiparae. It was also seen to a greater extent in the coloured and Latin races. It is to be attributed to hypertrophy of the pituitary. Erdheim and Stumme have shown that this gland, in pregnancy, may enlarge to two or three times its original volume.

F. A. W-N.

(11) **Cockayne, E. A.; Krestin, David; and Sorsby, Arnold.—Obesity, hypogenitalism, mental retardation, polydactyly and retinal pigmentation. The Laurence-Moon-Biedl syndrome.** *Quart. Jl. of Med.*, New Series, Vol. IV, No. 14, April, 1935.

(11) **Cockayne, Krestin and Sorsby** report at length on two families with children affected by the Laurence-Moon-Biedl syndrome. Reports date back to 1866 when Laurence and Moon reported in the old Ophthalmic Review a family in which were four cases of retinitis pigmentosa associated with general imperfections. These cases appear to have come under the care of Sir Jonathan Hutchinson at some later date, and were reported by

him in 1900, from notes made about 25 years previously. Nettleship, reviewing the literature on retinitis pigmentosa in 1908, concluded that Hutchinson's reports concerned the original family of Laurence and Moon, in spite of minor discrepancies in the two accounts.

Other cases are discussed by the authors together with a review of the literature. The cases described under family A. and family B. were all, with the exception of the first case in family B., shown at the Ophthalmological Section of the Royal Society of Medicine by Hill and Sorsby. The records are very full.

The authors' summary is as follows:—"Two families are reported, one of ten members of whom three and possibly four, were affected, and another of four members of whom three were affected. There was no consanguinity of parents in either group. In the first group no member showed the complete syndrome, but all the constituents of the syndrome were seen between the three patients. The eldest, 26 years of age, showed moderate adiposity, mental retardation, and retinitis pigmentosa; there was no polydactyly and no obvious hypogenitalism. The second showed the complete Fröhlich syndrome, mental retardation and retinitis pigmentosa; there was no polydactyly. The third showed polydactyly on both hands in addition to mental retardation and retinitis pigmentosa; he showed neither adiposity nor hypogenitalism.

In the second family polydactyly was present in all three: on the left hand and both feet in the eldest, on all the four extremities in the second, and on the two hands but not on the feet in the third. Adiposity and mental retardation were present in all three, as also moderate hypogenitalism in the eldest. The fundi showed the appearances seen in cerebro-macular disease."

The paper is illustrated by coloured drawings of the fundus changes seen in one member of each family, with monochrome drawings of the fundi in other members and a photograph of the second member of family A.

A very full genetic analysis and bibliography complete a paper which should be read in the original. It forms a fine record of a remarkable clinical research.

R. R. J.

(12) **Waardenburg, P. J. (Arnhem).—An unusual combination of congenital deformities: bilateral buphthalmos associated with acrocephalosyndactyly, morbus cordis, hermaphroditism and other abnormalities. (Eine merkwirdige Kombination von angeborenen Missbildungen).** *Klin. Monatsbl. f. Augenheilk.*, XCII, p. 29, 1934.

(12) **Waardenburg** reports the following congenital defects in a child born at full term of non-consanguineous parentage:—Mongolian folds, hydrocephalus, divergent squint, buphthalmos,

congenitally opaque cornea, and hypertelorism. Cranio-facial deformities suggestive of the overt acrocephaly syndactyly were also present; the nose with its parrot-beak appearance fitted in more with the Crouzon type of defect, but prognathism of the upper jaw was also apparent. Extensive skeletal defects were revealed by the following:—Cleft-palate, contractures at elbow and knees, syndactyly of fingers and suppression of one toe on each foot. Other defects were:—Pseudo-hermaphroditism, cryptorchism and morbus cordis. The report discusses cases of a similar type.

ARNOLD SORSBY.

(13) **Jaensch, P. A. (Breslau).—Rare eye changes in Christian-Schüller disease. (Seltene Augenveränderungen bei Schüller-Christianscher Krankeit).** ***Klin. Monatsbl. f. Augenheilk.***, Vol. XCII, p. 158, 1934.

(13) **Jaensch** reports the case of a boy, 9 years of age, showing the Christian-Schüller syndrome in a typical manner (lacunae in skull, diabetes insipidus, right-sided exophthalmos and xanthelasma on eyelids and skin). There were also present two features of special interest:—(1) A white mass measuring 6·0 D. on the disc of the right eye as also some yellowish nodules in the outlying retina; (2) a subconjunctival mass at the limbus, diagnosed histologically as a lipoid granuloma; giant cells and foam cells were present. An opacity in the cornea, probably due to fatty degeneration developed later. The cholesterin content of the blood was below normal.

ARNOLD SORSBY.

(14) **O'Brien, C. S. and Leinfelder, P. J. (Iowa City).—Unilateral exophthalmos.** ***Amer. Jl. of Ophthal.***, February, 1935.

(14) **O'Brien and Leinfelder** have investigated 82 cases of unilateral exophthalmos and in this paper classify their results and discuss the differential diagnosis. Thirty-one cases were caused by inflammation in the orbit due to extension from adjacent suppurative sinusitis, after a perforating injury, actinomycosis, cellulitis complicating panophthalmitis (11 cases), cellulitis with infective cavernous-sinus thrombophlebitis (2 cases), osteomyelitis and periostitis. In these inflammatory conditions the symptoms and signs were of sudden onset and rapid progress, proptosis increasing rapidly day by day, ocular movements becoming limited, pain, localized tenderness, redness, swelling, congestion, chemosis and occasionally a fluctuating mass to be felt in the orbit. In some cases there was elevation of the temperature and leucocytosis.

Fifty-one cases were due to non-inflammatory changes including benign and malignant neoplasms; the effects of injury, haematoma,

arterio-venous aneurysm, and emphysema; exophthalmic goitre; and unilateral high axial myopia.

Among the 10 cases of benign neoplasms such rarities as 1 case of adamantinoma in a 7-year-old child is described, and 1 case of chondromyxoma is also reported.

H. B. STALLARD.

(15) **Pallestrini (Modena).—Inhibition of spontaneous nystagmus due to endocranial neoplasm as an aid to prognosis. (Sulla inibizione del nistagmo spontaneo patologico quale elemento di prognosi della cura chirurgica dei neoplasmi endocranici).** *Riv. Oto.-Neuro.-Oftal.*, September-October, 1934.

(15) Nystagmus is one of the most important symptoms in endocranial tumours not only as a means to localize the lesion, but also as a measure of its progress. It is possible in the early stages to bring about inhibition of the nystagmus by stimulation of the vestibules, either by rotating the patient or by injecting warm water; if the inhibition cannot be produced, it is possible to feel certain of the presence of grave lesions affecting either the vestibular nuclei or the conducting apparatus.

Pallestrini holds that this method of examination should always be tried in these cases, since he has seen good results follow operation only in those in which the production of inhibition showed the disease to be limited.

HAROLD GRIMSDALE.

(16) **Marquez, M. (Madrid).—An atypical case of Mikulicz's disease. (Un caso de sindrome de Mikulicz atipico).** *Arch. de Oftal. Hisp.-Amer.*, Vol. XXXIV, p. 513, 1934.

(16) Marquez describes an atypical case of Mikulicz's disease, occurring in a man 58 years of age. The symptoms, as noticed by the patient himself, were watering of the eyes for the past 18 months, followed by swelling of the upper lids. There was never any pain. The patient was thin and emaciated, and was suffering from alternating constipation and diarrhoea. On examination, the parotid glands were swollen, there was a swelling in the left side of the lower lip and in the supra-hyoid region; the glands of the neck were also enlarged.

There was some proptosis of both eyes, marked swelling of the lacrymal glands, a swelling in the inner third of the right upper lid, and also between the lacrymal sac and the pulley of the superior oblique There was some impairment of upward movement of the right eye and an accompanying diplopia.

The lacrymal gland tumour on the right side was removed, and also the swelling on the inner side of the same lid. Both

were reported to have the structure of a lymphosarcoma. A blood count showed a red cell count of 3,830,000 only. The leucocyte count was 5,600.

The author considers that the swelling on the inner side of the lid was a gland of Krause, which had been invaded and destroyed.

The patient refused to remain in hospital, and was treated in his own village with arsenic injections, but without any result. He was then given insulin injections as prescribed by Vogt.

A year later the patient was suffering from severe and excessive lacrymation. In the right lower lid there was another localized swelling.

The blood count now showed a marked leucocytosis and eosinophilia.

The tumours in the eyelids were removed. A detailed account is given of the macroscopic and microscopic appearance of these tumours. The pathologist who examined them considered that there was a hyperplasia of lymphoid tissue.

The varying histology in these cases and the various types of the disease with the theories of their causation are discussed at some length.

The author questions if there is any relationship between the intestinal infection in this case and Mikulicz's syndrome.

The remaining swellings of the parotid, etc., were treated by X-ray therapy.

E. E. CASS.

BOOK NOTICES

Ophthalmic Nursing. By MAURICE H. WHITING. Second edition. Pp. 184, 54 Illustrations. London: J. and A. Churchill, Ltd. 1935. Price, 5/-.

In the second edition of this book the author has incorporated material concerning important advances in ophthalmology during recent years and in describing these has dealt with those practical points which affect ophthalmic nursing. New sections are therefore devoted to the surgical treatment and nursing of retinal detachment cases, orthoptic training, ultra-violet light therapy and diathermy. The opportunities for the majority of general trained nurses to obtain adequate experience of ophthalmic cases are few and so it happens that apart from the nursing staffs of ophthalmic hospitals good eye nurses are rare.

The author has presented in a concise and lucid manner the essentials of ophthalmic nursing giving a short but comprehensive

account of the medical and surgical principles involved in its practice. The nursing practices described by the author are used at the Moorfields Eye Hospital and are the outcome of more than a century of experience and tradition.

The book is not only of value to nurses but will be of interest to medical students, house surgeons and practitioners.

It is well produced and the illustrations and diagrams are clear.

The Amblyopia Reader. With a foreword and notes by MARGARET DOBSON. Pp. 93, 27 Illustrations. London: Rembrandt Photogravure, Ltd. 1935. Price, 15/-.

This book is designed to assist the training of a child with an amblyopic eye from strabismus. A number of illustrations accompanied by the appropriate nursery rhyme are printed in orange and black lettering after the manner of stereoscope cards. The lettering of the rhymes is printed in various sized types from J.16 to J.1 corresponding approximately with Snellen 6/60 to 6/6 respectively. The sound eye is covered by a ruby filter which makes all orange colouring invisible and by this means the amblyopic eye sees words and pictures in orange and black whilst the sound eye sees the black parts only.

Amblyopic eyes are found to respond more readily to an orange stimulus than other colours, which are in some cases unseen. The ruby filter also has the advantage of decreasing the intensity of the light stimulation even in the black part of the word. If desired a further reduction of the visibility of the sound eye may be effected by using the filter over a Chavasse or Scientype occlusion glass.

The filter may also be employed in the diagnosis of malingering. Three exercises are described by Miss Margaret Dobson in the instructions for use. The foreword also has been written by her.

Medical Annual General Index. Vol. V. Bristol: John Wright and Sons, Ltd. London: Simpkin Marshall, Ltd. 1935. Price, 12/6.

This constitutes the General Index of the Medical Annual for the ten years, 1925 to 1934.

A new feature in this volume is the survey of the progress in each subject during the years under review by the sectional editor. For ophthalmology this is Sir Stewart Duke-Elder. Another interesting feature is the list of contributors to the medical annual from its origin to 1924. We note that Mr. William Lang was the first editor of the ophthalmic section.

The book will be indispensable for ready reference. The format, printing, etc., are excellent.

CORRESPONDENCE

To the Editors of THE BRITISH JOURNAL OF OPHTHALMOLOGY.

SIRS,—In your issue of July, 1935, Dr. A. F. MacCallan comments on an article by Lieut.-Col. Wright, on "The Trachoma Problem," which appeared in the June number of your Journal.

Dr. MacCallan has confused the Sikh civil population (from which recruits are drawn) with the Sikh soldiers of the Indian Army. It has been found that, amongst the former, the incidence of trachoma is well over 90 per cent. Amongst the latter active trachoma is an infrequent and trivial disease. This is due to the recruiting sieve. In his annual report for 1934, the military ophthalmologist, Poona, makes the following remarks.

These remarks are typical of those received from the other ophthalmological specialists serving with the Army in India.

"A Punjabi battalion, strength 703, containing a large proportion of Pathans and Sikhs, arrived recently in the station.

The men were specially examined for trachoma, with the following results:—

Percentage of total trachoma cases in *all* stages ...		28
Acute infection, liable to spread		Nil.
Unfit for service		Nil.
Number of cases requiring treatment		10
	i.e.,	1·4%

None of the cases complained of eye trouble.

Many were found to have old scars of healed trachoma.

Incidence amongst the younger men was no higher than amongst the older soldiers—showing that medical examination on recruitment is satisfactory.

As usual, it was found that Pathans and Sikhs are the most heavily infected, and Dogras the least.

It can be safely stated that the slight relaxation of the regulations for the recruitment of cases of trachoma has had no adverse effect on the health of the Army.

No case of trachoma was invalided during 1934."

Hence, our appraisement of the value of the quotation from the French differs from that of Dr. MacCallan. Serious exception is taken to this quotation because it contains a mis-statement as gross as it is fantastic.

I have the honour to be, Sirs,

Your most obedient servant,

A. C. AMY.
COLONEL,
Deputy Director of Hygiene and Pathology.

ARMY HEADQUARTERS, INDIA.
August 2, 1935.

[ED.—A copy of this letter has been sent to Mr. MacCallan.]

To the Editors of THE BRITISH JOURNAL OF OPHTHALMOLOGY.

SIRS,—With reference to your annotation—"Intravenous Anaesthesia—Sodium Evipan" published in the August number (Vol. XIX, No. 8) of the *Brit. Jl. of Ophthal.*, we should like to point out one obvious mistake.

No one, as far as we are aware, has claimed that "the quiet induction of anaesthesia whilst the patient is in bed" is one of the advantages of Evipan. It has always been stressed that anaesthesia with Evipan is of comparatively short duration and that the anaesthetic is not given until the patient is ready on the operating table and the operation field prepared.

It would appear that the writer of your article had confused Evipan with Avertin, the latter drug being given per rectum before the operation whilst the patient is in bed.

We should also like to point out that the paroxysms of sneezing, coughing, etc.,which incidentally only occur in a very small percentage of cases when proper precautions are taken, are always over in a few minutes, and it is only a matter of delaying the commencement of the operation whilst this "stage" passes off.

Although we are fully aware of the advantages of local anaesthesia in eye work and its superiority to general anaesthesia in the majority of cases, yet we have found from experience that in those cases where general anaesthesia is indicated, Evipan, properly administered, has great advantages over other methods of anaesthesia.

We are,

Yours faithfully,

T. KEITH LYLE.
F. G. FENTON.

[ED.—The writer of the annotation—"Intravenous Anaesthesia —Sodium Evipan" is well aware that it is the usual practice to inject this drug when the patient is on the operating table. In the case of some nervous children it has been felt desirable that this should be done whilst the patient is in bed in a ward adjacent to or near the theatre and the patient then carried unconscious on a stretched canvas sheet from bed to the operating table. The field of operation has received preliminary preparation and is covered with sterile gauze before the anaesthetic is administered.]

OBITUARY

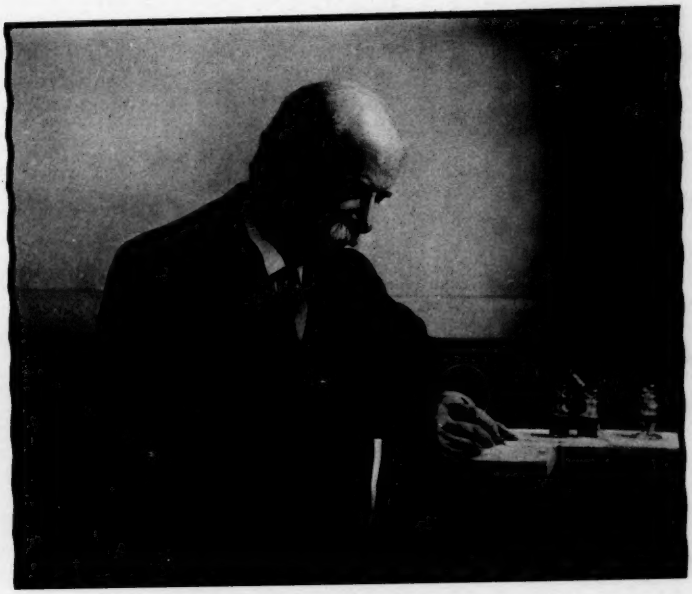
WILLIAM THOMAS HOLMES SPICER

THE death of Holmes Spicer seems to mark an epoch in ophthalmology in this country for he is almost the last of a small group who were of international fame. Thus he was an immediate link with Streatfeild, Hulke, Tweedy, and Nettleship, and was contemporary with Marcus Gunn, Lang, Lawford, Treacher Collins, and others. His attachment to Nettleship was especially close; he had the greatest respect and admiration for him and was in large measure his natural successor, for he succeeded to his clinic at Moorfields.

Holmes Spicer was a man of great native ability and would have made his mark in any walk of life. He was born at Saffron Walden in 1860 and was educated at Saffron Walden School, at Queen Elizabeth's School, Barnet, and entered Gonville and Caius, Cambridge, in 1879, obtaining a First Class in the Natural Science Tripos. From Cambridge he went to St. Bartholomew's Hospital where he was at once conspicuous among his contemporaries; he obtained the Brackenbury Scholarship in Surgery, the chief prize of its kind, and was elected President of the Abernethian Society. In 1884 he qualified as M.R.C.S., in 1886 as M.B., and in 1888 he became F.R.C.S. Eng.

For a short time he engaged in general practice in London but soon gave it up for ophthalmology for which he had always had a great liking. He began working at Moorfields, which at that time was in Moorfields before it migrated to its present site, in the Ophthalmic Department of St. Bartholomew's, and in Vienna.

He was appointed to the Moorfields staff in 1898, and on the death of Mr. Vernon was elected Ophthalmic Surgeon to St. Bartholomew's with Mr. Jessop as his senior colleague. He became Dean of the Medical School at Moorfields in 1899. Much of the popularity and high standing of the Royal London Ophthalmic Hospital as the teaching centre for ophthalmology in the Empire was due to the unostentatious but thorough work of Holmes Spicer as Dean. Quiet and dignified in manner he was possessed of great powers of organization and the wisdom of the measures which he proposed was rarely questioned by his colleagues. These two hospitals took up the greater part of his spare time and he continued his work at each till he attained the age limit; he was consulting surgeon to both at the time of his death; as well as to the Metropolitan and Victoria Hospital for Children. He joined the Ophthalmological Society of the United Kingdom in 1889, served on the Council 1900-1902, was Librarian from 1907-1912 and Vice-



WILLIAM THOMAS HOLMES SPICER

President, 1910-12. He was also President of the Ophthalmological Section of the Royal Society of Medicine. Late in life he was the first of the Gifford Edmonds Memorial prizewinners, and his essay on "Parenchymatous Keratitis: Interstitial Keratitis: Uveitis Anterior" was the first of the monograph supplements to be published by this Journal. He had a large private practice and was greatly loved by all his patients.

No one could come into contact with him without being conscious of his special charm; his integrity was unassailable and he represented all that was best in our profession. His clinical acumen was outstanding so that his opinion was much sought after and highly esteemed by his colleagues. He wrote nothing without careful thought and deliberation so that everything that came from his pen demanded and received respect. He was a good linguist; at one time a keen motorist; and was for many years a member of the Northwood Golf Club.

His particular interest outside his professional work was in art, and especially in water colour painting at which he was quite exceptionally proficient. I am not aware that he ever held an exhibition of his work but with good reason he might have done so, for not only was he an accomplished colourist but was also a finished draughtsman, a combination seldom found amongst amateurs. Through Mrs. Holmes Spicer's friendship with Sargent he was brought into contact with this great artist and was, I believe, influenced by him. He showed five pictures at the recent Medical Art Society's Exhibition and was present at it.

During the war he was eager to go out to France and was disappointed when it was pointed out that his valuable services had wider scope at home. For many years he served in an advisory capacity to the War Office.

He was also Ophthalmic Surgeon to the Queen Alexandra War Hospital and for nine years served on the War Office Appeal Board.

He had lived a full life and has left a deep impression on the ophthalmology of his time: his loss will be deplored by many.

R. FOSTER MOORE.

Sir John Parsons writes: "The death of Mr. Holmes Spicer has bereft ophthalmologists of an esteemed colleague and a loyal friend. He brought to his work a sound knowledge of general science, acquired at that best of scientific schools, Cambridge; but in addition he was widely read in literature and history, and endowed with unusual artistic ability and outlook. Coming early under the influence of the most scientific teacher of his time, Edward Nettleship, any high flights of imagination and originality, of which he was fully capable, were co-ordinated and

controlled by that stern but salutary taskmaster. With his gift of accurate draughtsmanship it was natural that his notes of cases should be profusely illustrated by sketches of abnormal conditions, often revealing to others the true nature of a case in a manner which verbal description alone failed to convey. He was specially interested in the innumerable types of corneal ulcer and opacity; and his Gifford Edmonds Prize Essay on "Parenchymatous Keratitis," etc., published as a monograph by the *Brit. Jl. of Ophthal.*, embodied the work of a lifetime. It is enriched by many exquisite drawings and will ever remain a classical contribution to the subject. On holidays and in retirement he gave free rein to his artistic bent, revelling in the beauties of scenery and architecture, perpetuating many scenes with no mean skill. One such sketch, which he gave to me, has been highly praised by competent critics, and there is little doubt that, had he devoted his life to art, he would have attained a high position—but that would have been at the expense of his outstanding contributions to ophthalmology. It is difficult for one who is proud to claim the title of a friend to convey the charm of Spicer's personality. Of massive build and sedate demeanour, always unperturbed and somewhat slow of speech, he was full of kindliness and humour. It was a unique experience to travel abroad with him and witness his enjoyment of everything--including the 'good things' of life."

NOTES

The Vitello Medal

THIS medal, of which we give an illustration, has been presented to Mr. Leslie Paton by Professor Szymanowski of Warsaw. It has been struck to commemorate the 400th anniversary of the publication of Vitello's book in 1535.

Vitello lived in Thuringia in the 13th century. His book is a translation, in mediaeval Latin, of the works of the Arabian Ibn Al-Haitam, of Basra, whose period was A.D. 965-1038. The book is an early optical treatise. It is noticed by Hirschberg in his *Geschichte*, Graefe-Saemisch Handbuch, Vol. XIII, p. 161.

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Hunterian Professorship

MR. A. F. MACCALLAN, C.B.E., has been appointed by the Council of the Royal College of Surgeons of England to be a Hunterian Professor for the ensuing year.

His lecture on "The Surgery and Pathology of Trachomatous Conjunctivitis" will be delivered on January 17, 1936.

* * * *

Belgian Ophthalmological Society

IN connection with the International Exhibition at Brussels the Société belge d'ophtalmologie is organizing a special meeting on Saturday and Sunday, September 21 and 22, 1935. All ophthalmic surgeons are cordially invited to attend. The following lectures will be delivered. Saturday, Dr. Paul Govaerts, Professor of Medicine in the University of Brussels, on "The Physio-pathology of Nephritis." Dr. Marcel Danis, Professor of Ophthalmology in the University, on "The Ocular Complications of Nephritis."

Sunday, Dr. Jeandelize, Professor of Ophthalmology at the University of Nancy, on "A few aspects of the relations of the Hypophysis and the Visual Apparatus." Dr. L. Weekers, Professor of Ophthalmology at Liège, on "The Treatment of Iridocyclitis with Hypertension."

Further information can be obtained from Professor van Duyse, 13, Place van Artevelde, Ghent.

On Monday, September 23, there will be a special meeting of the Belgian Oto-neuro-ophthalmological Society which is consecrated to the study of cerebral tumours.

All ophthalmologists are invited to attend the session.

* * * *

The late Professor Jules Gonin

A PHOTOGRAPH of the late Professor Jules Gonin arrived too late for publication with the obituary notice of his death in the August number. We hope to reproduce this photograph in the October number of this Journal.

John Symcottes

IN the journal of July, 1932 was printed a letter dealing with ophthalmological matters by John Symcottes. Subsequent research has revealed the fact that Dr. Symcottes was in practice in Huntingdon. He died in 1662. His will, (P.C.C. Laud, 159) was proved on December 15 of that year. He would appear to have left no issue, his effects being distributed among nephews and nieces. It may interest our readers to learn that Oliver Cromwell, as a young man, was under his care. In John Buchan's recent Life of Cromwell will be found the following reference to Sir Philip Warwick's Memoirs of the Reign of King Charles I. "Warwick knew his Huntingdon Physician, Dr. Simcott, who told him that Oliver was a 'most splenetic man,' and had fancies about the town cross, and used to summon him at midnight and other unreasonable hours under the belief that he was dying."

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Corrigendum

Observations on the Human Retina. By D. J. Wood (Cape Town). July, 1935. The author writes that p. 374, Fig. 6, " 'a' should be opposite the horizontal layer of fibrils, it is nearly in its place; 'b' should be immediately behind 'a', and 'c' should be opposite the spaces bounded by nerve fibrils."

Annotation—Sodium Evipan. July number, 1935, p. 463, line 5 from the top of the page, for 'consistency' read 'inconsistency.'

FUTURE ARRANGEMENTS

1935

October 1.—Midland Ophthalmological Society, at Birmingham Eye Hospital.

October 18.—North of England Ophthalmological Society, at Manchester.

November 15.—North of England Ophthalmological Society, at Bradford.

December 3.—Midland Ophthalmological Society, at Birmingham Eye Hospital.

December 6.—North of England Ophthalmological Society, at Leeds.

1936

February 7.—North of England Ophthalmological Society, at Newcastle-on-Tyne.

March 6.—North of England Ophthalmological Society, at Liverpool.

March 27.—North of England Ophthalmological Society, at Sheffield.

CONTEMPORARY OPHTHALMIC LITERATURE

American Journal of Ophthalmology. *July, 1935.*

REED and MAYER. Bilateral temporal pterygia.
WENDELL HUGHES. Aniseikonia.
HOLLANDER and BAER. The common disorders of the skin of the eyelids.
MAGOUN, RANSOM AND MAYER. The pupillary light reflex after lesions of the posterior commissure in the cat.
SELINGER. Local quinine therapy in trachoma.
COGAN, Uveoparotid fever.
ROSS and SHIPMAN. Malignant anthrax oedema.
LAMB. Corneal corpuscles in the reaction of hypersensitiveness.
ROWLAND. Ocular pathology of the new-born.

Annales d'Oculistique. *July, 1935.*

MAGITOT. Victor Morax.
ROCHON-DUVIGNEAUD. Structure and form of the crystalline lens.
GASTEW and WERPOUKHOWSKY. Sarcoma of the cornea.

Archives d'Ophtalmologie. *July, 1935.*

TERRIEN. Semeiological value of papillary stasis in serous meningitis.
VAN DUYSE and VAN CANNEYT. Do traumatisms favour the appearance of experimental syphilitic manifestations (primary and metastatic) of the eye, and can they aggravate existing lesions?
MÉDINGER and MORARD. Cranio-facial dysostosis, Crouzon's disease.
DIMISSIANOS. Epithelial keratitis of tuberculous origin.
SPIRATOS. Biological and epidemiological researches on the streptococcus of the eye.

Revue d'Oto-Neuro-Ophtalmologie. *June, 1935.*

VIALLEFONT. Von Hippel's disease. Lindau's disease.
VELTER. The physiology of the orbicularis and the problem of the superior facial.

Klinische Monatsblätter für Augenheilkunde. *June, 1935.*

FUCHS. Circumscribed retinal detachment to the edge of the ora serrata from the beginning of a sarcoma of the choroid.
BLOBNER. Angioid streaks, pseudoxanthoma elasticum and epilepsy in two brothers. A hereditary degenerative syndrome.
SATTLER. Experience with contact glasses.
BARTELS. Acquired decrease through monophthalmus.
VON LIEBERMANN. The question of intra-capsular extraction. Round pupil or iridectomy?
KESTENBAUM. A modification of Kuhnt-Szymanowsky's ectropion operation.
VANNAS and WILSKA. A method of measurement of the fluorescence of the living human lens and an investigation on the age declivity.
KURZ. The morphology of congenital cataract with crystal formation.
NIZETIC. The Denig operation for trachomatous pannus.
NÉMETH. Lattice degeneration of the cornea.
ENRIQUEZ New additional reduction for microscopy of the living eye.

Zeitschrift für Augenheilkunde. *July, 1935.*

BÖCK. A case of haemato-poietic marrow in hetero-plastic bone of an atrophic eye together with observations on a post-mortem result in chronic uveitis.
HINRICHS. Influence of weather and season on the origin of eye disease.

ROHRSCHNEIDER. The spring climax of scrofulous eye disease.
KLEIN. Choroidal sarcoma with sarcomatosis of the soft membrane of the brain.
LEWITSKY. Intra-ocular cysticercus.

Archivio di Ottalmologia. *March-April, 1935.*

ROSSI. Individuality and the organ in ophthalmology.
BRACCI-TORSI. The ascorbic acid content (vit. C.) in the retina and supra-renals of animals. (Experimental research.)
CASTELLI. Experiments and observations on the mydriatic action of adrenaline, synthetic ephedrine (ephetone), simpatole and ordenine.

Annali di Ottalmologia e Clinica Oculistica. *May, 1935.*

MARCHESINI. Clinical contribution to deep central interstitial keratitis.
BIFFIS. On a case of plasmocellular conjunctivitis in a subject affected by the broncho-spirochetosis of Castellani. (Clinical and histo-pathological study).
BRACCI-TORSI. Clinical contribution to the ocular manifestations in exudative diathesis.
FAZIO. Research on the degenerative processes of the crystalline lens after irradiation with infra-red rays.
LASZLÓ. The approach of the different syphilitic reactions in ophthalmology.

Rassegna Italiana d'Ottalmologia. *May-June, 1935.*

VOLLARO. Modification and perfection of some instruments of habitual use in ocular surgery.
BELLAVIA. The eye and diabetes.
GABARDI. Occlusion of the central retinal artery.
PERGOLA. Congenital ptosis associated with ocular malformations.
MOSSA. Experimental research on ocular reactions of an allergic nature.
DE VINCENTI. A new case of ocular malformation.
VALENTI. Further remarks on the cure of kerato-hypopyon.
MORETTI. An exceptional case of total retrograde permeability of the lacrymal passage.
GALLENGA. About the importance of the osmotic pressure in the absorption of the medicamental solutions which traverse the cornea.

Archivos de Oftalmologia Hispano-Americanos. *June, 1935.*

MIER and CHERIF. A case of melanoepithelioma of the orbit.
ORTIZ. The rôle of vagosympathetic imbalance in the pathogenesis of spring catarrh.

Revista Oto-Neuro-Oftalmologica y de Cirugia Neurologica. *July, 1935.*

PAVIA and DUSSELDORP. Marginal keratitis with ectasia. Cure.

Archivos de Oftalmologia de Buenos Aires. *April-May, 1935.*

ZAVALIA and OLIVA. Angioid streaks in the fundus.
PRADO. Rare cases of ocular syphilis. Syphilis of the conjunctiva.
TISCORNIA. Ectopia lentis.